THE WHITMAN Companies, INC.

300262

REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN

FOR

ROCKAWAY BOROUGH WELL FIELD SITE
OPERABLE UNIT #3
FOR PROPERTY OF
KLOCKNER & KLOCKNER
ROCKAWAY BOROUGH, NEW JERSEY

SUBMITTED TO:

USEPA - REGION II
EMERGENCY & REMEDIAL RESPONSE DIVISION
NEW YORK, NEW YORK

SUBMITTED BY:

THE WHITMAN COMPANIES, INC.
EAST BRUNSWICK, NEW JERSEY

ON BEHALF OF KLOCKNER & KLOCKNER

IN ACCORDANCE WITH:

ADMINISTRATIVE ORDER ON CONSENT
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1.0 INTRODUCTION

This Remedial Investigation/Feasibility Study (RI/FS) Work Plan has been prepared by The Whitman Companies, Inc. on behalf of Klockner & Klockner (Klockner) in accordance with Chapter VIII, Paragraph 28 of the Administrative Order on Consent (AOC) entered into by Klockner and the United States Environmental Protection Agency (EPA), and Task I, Item C of the Statement of Work (SOW) (USEPA, 1995). The purpose of the RI/FS Work Plan is to describe the activities to be conducted during the RI/FS for the Rockaway Borough Wellfield Site (Site) - Operable Unit #3 at Block 5, Lots 1 and 6, and Block 7, Lots 7 and 8, in the Borough of Rockaway (Klockner Property). Operable Unit #3 consists of response activities associated with source areas of groundwater contamination at the Site. The RI/FS also is designed to identify and characterize soil contamination and potential sources of groundwater contamination, identify potential applicable or relevant and appropriate requirements (ARARs), and develop a range of remedial alternatives for source areas located above the water table.

1.1 Report Organization

The RI/FS Work Plan is organized as follows:

- **Section 1** - this section presents the purpose and organization of the RI/FS Work Plan and the location of the Klockner Property.

- **Section 2** - this section presents a history of the Site and Klockner Property, and a description of the conditions at the Klockner Property.

- **Section 3** - this section presents information concerning hazardous substances present on the Klockner Property and a summary of the findings of past environmental investigations of the Klockner Property.

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- **Section 4** - this section presents a preliminary evaluation of impacts on potential receptors, remedial alternatives, and applicable or relevant and appropriate requirements (ARARs), which will be used as guidance during development and evaluation of remedial alternatives, as well as a summary of the RI objectives, data requirements and data quality objectives (DQO).

- **Section 5** - this section presents a description of each task to be performed during the RI/FS. The RI/FS consists of the nine standard RI/FS tasks identified in the SOW and described in EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01, October, 1988 (USEPA, 1988a).

- **Section 6** - this section presents project organization and responsibility and a schedule for conducting the RI/FS.

- **Section 7** - this section presents references.

The tables, figures and appendices are located in the tabulated sections identified as "Tables", "Figures", and "Appendices."

1.2 Klockner Property Location

The Klockner Property is located at the intersection of Stickle Avenue and Elm Street in the north end of the Borough of Rockaway in Morris County, New Jersey. The Klockner Property is a portion of the Site, which itself encompasses approximately 2.1 square miles. See Figure 1.1 for the Klockner Property location on a U.S.G.S. Dover, N.J. quadrangle. A site map of the Klockner Property is included as Figure 1.2.

The Rockaway Borough well field is located approximately 600 feet southwest of the Klockner Property. The location of the Rockaway Borough well field and the Klockner Property are indicated on Figure 1.3.

The Klockner Property consists of two separate properties. One of the properties is located north of Stickle Avenue and is currently owned by Klockner. This portion of the Klockner Property, Block 5, Lots 1 and 6, has been known for many years as the Building 12 Property, and will be referred to as such in this report. The second portion of the Klockner Property is located south of Stickle Avenue and consists of Block 7, Lots 7 and 8. This portion of the Klockner Property has been known as the Building 13 Property and will be referred to as such in this report. Lot 7 is currently owned by Norman Iverson and operated by F.G. Clover Co. Lot 8 is currently owned by Klockner and is used as parking

for Building 12 tenants. However, Lot 8 of the Building 13 Property was historically associated with Lot 7 and the operations thereon. Accordingly, Lot 8 will be discussed as part of the Building 13 Property, even though it is now owned by Klockner.

The Building 12 Property consists of 1.34 acres. The majority (approximately 93%) of it is covered by building structures and pavement. The building structure consists of approximately 50,000 square feet of one and two story space used for manufacturing, office space and storage. The Building 12 Property is bordered to the south by Stickle Avenue, to the west by Oak Street and residential housing, to the north by Ford Road and to the east by Elm Street.

Lot 7 of the Building 13 Property consists of approximately 1.07 acres, and Lot 8 consists of approximately 0.5 acres. There are two building structures present on Lot 7 of the Building 13 Property. Lot 8 is a partially paved area with no structures. The building coverage is approximately 12,400 square feet. Approximately 50% of the Building 13 Property is covered by building structures and pavement. The Building 13 Property is bordered to the north by the Building 12 Property (across Stickle Avenue), to the west by residential properties (across Elm Street), to the south by residential property, and to the east by a railroad line.

2.0 BACKGROUND

2.1 Site Conditions

2.1.1 Site Geology/Hydrogeology (FE, 1989c)

As determined through regional studies conducted by the New Jersey Department of Environmental Protection (NJDEP) for the Rockaway Borough and Township well fields, the Klockner Property lies within a region in which the geology is characterized as consisting of glacial till deposited over shallow bedrock. However, valley-fill deposits have been found to include other materials. The Klockner Property is situated on the remnants of the terminal moraine that developed during the Wisconsin glaciation. In addition, stratified and unstratified drift, alluvial deposits, and lacustrine silts and clays were found to be present in the typical lithologic section at the site. These glacial sediments may be as thick as 150 feet in the area.

Two distinct aquifers have been defined in this area, which are referred to herein as the shallow and deep aquifers. These aquifers are separated by a silty-clay confining unit.

Examination of the data collected during the drilling and geologic sampling for site investigations, pursuant to the New Jersey Environmental Cleanup Responsibility Act (ECRA), shows that the Klockner Property is underlain with a layer of surficial fill materials that range in thickness from 2 to 8 feet. The fill materials are generally composed of sands, silts, clays and some gravel. Underlying the fill is a yellow or tan sandy alluvial deposit which forms the shallow aquifer. The saturated thickness of the sandy alluvium is as great as 10 feet and appears to thin toward the north. This unit acts as the water table aquifer beneath most of the site.

The sandy alluvium beneath the Klockner Property lies on an irregular surface of lacustrine, laminated silt and clay which ranges in thickness from about 10 to more than 20 feet. The top of this silty clay unit slopes toward the surface at the north end of the Klockner Property and rises above the elevation of the water level in the shallow aquifer. In this area the alluvium thins to about 4 feet and becomes unsaturated. The contact between the alluvium and the lacustrine sediments is often detected as a color change from yellow or tan to gray which accompanies the lithologic change. As indicated by the approximate 9 foot head difference between the shallow and deep aquifer water levels, the lacustrine sediments form an areally extensive confining unit between the shallow and deep aquifers beneath the Klockner Property. The lithologic character of the confining unit ranges from sandy silt to silty clay.

Beneath the silty-clay confining unit is the thickest and most permeable unit of the valley-fill deposits, which forms the deep aquifer. The materials encountered during drilling of the deep wells on the Klockner Property were reworked glacial till including silt, sand, coarse gravel, cobbles and boulders. Groundwater levels in the deep aquifer generally rise above the top of the aquifer, indicating that the unit is semi-confined locally although it has been depicted as the water table aquifer elsewhere. A cross section of the subsurface geology is provided in Figure 2.1.

2.1.2 Topography/Drainage

The southern portion of the Building 12 Property is covered by building structures. The northern portion of the Building 12 Property is paved and slopes to the south. The southern portion of Lot 7 of the Building 13 Property slopes to the southwest, and the northern portion slopes to the north. The Lot 8 portion of the Building 13 Property is relatively flat with an increase in elevation on the east end. The Klockner Property is located at an elevation of 520 to 525 feet above mean sea level. A survey of the Klockner Property topography is provided in Figure 2.2.

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In general, drainage from Building 12 is collected in storm sewer catch basins and storm drains which discharge to the Borough of Rockaway storm sewer system. Building 13 drainage is collected in an on-site storm sewer catch basin and in catch basins located on Stickle and Elm Streets that discharge to the Borough of Rockaway storm sewer system. The storm sewer system discharges to the former Morris Canal, located approximately 800 feet south of the Klockner Property. The former Morris canal drains into the Beaver Brook. The Beaver Brook is located approximately 1,000 feet east of the Klockner Property. The Rockaway River is located approximately 1,800 feet southeast of the Klockner Property. The site location on the U.S.G.S. Dover, New Jersey Quadrangle is indicated on Figure 1.1.

2.2 Site History

The Site is a municipal well field that serves approximately 10,000 people. Rockaway Borough's three water supply wells (#1, 5 and 6) draw water from an unconsolidated glacial aquifer from a depth ranging from 54 to 84 feet below grade. The supply wells are located off of Union Street and are southwest of the Klockner Property.

Contamination of the Site groundwater was first discovered in 1979. The primary contaminants identified were Trichloroethylene (TCE) and Tetrachloroethylene (PCE). Several inorganic contaminants, including Chromium, Lead and Nickel, were also identified. In December 1982, the Site was placed on the EPA's National Priorities List of Superfund sites.

Following discovery of ground water contamination, NJDEP conducted an RI/FS (SAIC, 1986), which was known as Operable Unit 1 (OU1), and EPA conducted a second RI/FS (ICF, 1991a and b), which was known as Operable Unit 2 (OU2). Through these studies, the Klockner Property was identified as one of the potential source areas of the Site contamination.

The remediation of the plume of groundwater contamination originating from the Klockner Property area is being addressed by Thiokol Corporation pursuant to a Consent Decree entered into between it and EPA in 1994. An RI/FS of contaminated soils and sources of groundwater contamination at the Klockner Property is being under taken by Klockner in accordance with the October 1995 AOC and SOW.

2.3 Previous Investigations of Klockner Property

2.3.1 Investigation Under the New Jersey Environmental Cleanup Responsibility Act (ECRA) - Building 12 Property

In August 1985, ECRA was triggered by a pending sale of the Building 12 Property. The operations of two tenants, Service Metal Fabricating (ECRA Case #85552) and Masden Industries/Multiform Metals (ECRA Case #85551) were subject to ECRA. As a result of the ECRA trigger, a comprehensive environmental investigation of the Building 12 Property ensued, under NJDEP review and oversight.

In November 1985, the ECRA Site Evaluation Submission (SES) for Masden Industries was submitted to NJDEP. The SES included a Sampling and Analysis Plan for the Building 12 Property. The report identified areas of potential environmental concern, including three underground heating oil tanks. The tanks were identified as Tanks #1, #2, and #3. Tanks #1 and #2 were 1,000 gallons in capacity, and tank #3 was 5,000 gallons in capacity. Soil sampling around each of the tanks was proposed. The Sampling and Analysis Plan was revised on December 3, 1985 based on NJDEP comments issued on November 21, 1985.

On December 23, 1985, the Service Metal Fabricating facility was inspected by the NJDEP ECRA case manager (Ground/Water Technology, Inc. [GTI], 1986 Appendix B). No deficiencies were noted. The presence of chromium solutions was indicated. All that remained to close the Service Metal Fabrication ECRA Case was the submittal of a Negative Declaration.

The Masden Industries facility was also inspected on December 23, 1985. Eleven deficiencies and actions to be taken were noted (NJDEP, 1985) (see First Amended Summary Report Attachment 1). Two additional areas of potential environmental concern were identified prior to the commencement of the Sampling and Analysis Plan for the Masden facility. These areas were the storm sewer catch basins on the north side of the facility and a 1,000 gallon underground waste oil tank (Tank #4). The catch basin was identified as an area of concern based upon the presence of drum storage in this vicinity, as noted in the December 23, 1985 NJDEP Site Inspection Report. The waste oil tank contents were sampled, and analysis indicated the contents consisted of TCE at 92% concentration.

The three underground heating oil tanks and the waste oil tank were removed in April 1986. Post-excavation soil samples were collected from the excavations by GTI and delivered to ICM Laboratory (ICM) (New Jersey Certified Laboratory #14116) for the

appropriate analysis. Analytical results indicated the presence of Petroleum Hydrocarbons (PHC) at two of the heating oil tanks. PHC and VOC were detected in the waste oil tank excavation. The sediments were removed from the catch basins. A sample of the sediment was delivered to ICM for appropriate analysis. Analytical results indicated the presence of PHC and VOC.

On May 22, 1986, based upon the April 1986 post-excavation sample results, additional soil excavation was conducted at two of the heating oil tank locations and the waste oil tank location. All of the excavated contaminated soils were properly disposed off-site. Post-excavation soil samples were collected from the excavations by GTI and delivered to ICM Laboratory for the appropriate analysis. The post excavation samples indicated that no further actions were necessary.

The analytical results for the sampling activities were submitted to NJDEP on June 25, 1986. On September 11, 1986, NJDEP issued comments recommending the installation of both shallow and deep monitoring wells to investigate the potential impact of the waste oil tank on groundwater quality.

The results of the April and May 1986 sampling activities and a proposal for further sampling activities were submitted to NJDEP in the November 1986 Sampling Plan (Revised) (GTI, 1986). No further actions were proposed for the three heating oil tank excavations. An integrity test was proposed for the storm sewer system, followed by excavation if the system leaked. Investigation of groundwater was proposed based upon the results of the waste oil tank excavation activities.

The November 1986 revised Sampling Plan was approved by NJDEP in a letter dated March 5, 1987. Following NJDEP's approval, the storm sewer was integrity tested and found to leak. A fifth underground storage tank (Tank #5) was found, and excavated during August 1987. The tank contained gasoline and had a capacity of 550 gallons. Post-excavation samples were collected and preliminary indications were that no further action was necessary for this area. Groundwater monitoring wells were installed in April and June 1987 by Moretrench Environmental Services (MES). The wells were sampled during the period of June 30 to July 2, 1987. A second round of groundwater sampling was conducted on August 7 and August 10, 1987. The analytical results indicated the presence of VOCs, primarily TCE and USEPA Priority Pollutant Metals (Metals).

The results of the approved November 1986 revised Sampling Plan activities and a proposal for further sampling activities were reported to NJDEP in the October 1987 Sampling Plan Results (MES, 1987). No further action was proposed for the gasoline tank

excavation. The further investigation of groundwater contamination and soil sampling at the storm sewer system were proposed.

During October 1987, a fourth deep monitoring well was installed. Soil samples for laboratory analysis were collected from the well boring to determine the vertical distribution of VOC contamination in soil below the water table. The analytical results indicated the presence of VOCs in the soil well below 1 part per million (ppm). The monitoring well was sampled for laboratory analysis on November 25, 1987. The analytical results indicated the presence of TCE in the groundwater.

In November 1987, an engineering construction drawing for a degreaser pit located in Building 12 was found. The pit was located, and field head space samples were analyzed from the sub-base below the pit with a portable gas chromatograph. The results were inconclusive.

On December 14, 1987, a former leaching pit was uncovered and soil samples were collected for laboratory analysis. The leaching pit was located at the southwest corner of the Building 12 Property. The analytical results indicated the presence of VOCs.

On April 15, 1988, NJDEP issued comments concerning the October 1987 Sampling Plan Results. NJDEP required the installation of additional monitoring wells to further delineate groundwater contamination. In August 1988, an ECRA Sampling Plan Addendum was submitted to NJDEP by First Environment on behalf of Klockner in response to NJDEP's April 15, 1988 comments.

On October 26, 1988, the storm sewer system was exposed and investigatory soil samples were collected for laboratory analysis. The analytical results indicated the presence of VOCs and Petroleum Hydrocarbons.

During November 1988, the fifth and sixth shallow monitoring wells were installed. All of the on-site shallow monitoring wells were sampled for laboratory analysis in December 1988. The analytical results indicated the presence of VOCs and Metals.

On June 8, 1989, a conditional approval of the August 1988 ECRA Sampling Plan Addendum was issued by NJDEP.

During February 1989, contaminated soils detected at the former leaching pit and one of the storm sewer catch basins were excavated. The quantity of soil excavated from the storm sewer catch basin excavation was approximately 53 cubic yards. The quantity of soil

excavated from the leach pit was approximately 10 cubic yards. Post-excavation soil samples were collected and the soils were properly disposed off-site. The post excavation samples indicated that no further actions were necessary with respect to the contaminants analyzed.

During August 1989, a Sampling Results Report and At Risk Sampling Results Report (First Environment [FE], 1989a & b) were submitted to NJDEP by First Environment on behalf of Klockner. The results of the remediation of the storm sewer system and leaching pit were provided. No further actions were proposed for these two areas. The further investigation of the degreaser pit area was proposed. The results of the groundwater investigation and proposal for a groundwater pump test were provided.

On September 18, 1989, a response to NJDEP's June 8, 1989 comment letter was submitted to NJDEP by First Environment on behalf of Klockner.

On September 21, 1989, soil samples were collected from the soil beneath the degreaser pit for VOCs laboratory analysis. No contamination was detected.

During August and September 1989, four additional monitoring wells (2 shallow and 2 deep) and two shallow piezometers were installed. The monitoring wells were sampled on September 25 and September 27, 1989 for VOCs laboratory analysis. The analytical results indicated the presence of VOCs. A pump test of the shallow aquifer beneath the Building 12 Property was conducted from October 26, 1989 to November 7, 1989.

On November 13, 1989, NJDEP issued a letter requesting submittal of an ECRA withdrawal affidavit as there no longer existed an ECRA trigger at the Building 12 Property, due to the termination of negotiations for the sale of the Building 12 Property.

In December 1989, a Sampling Results report (FE, 1989c) was prepared by First Environment for Klockner. The report indicated that the former use of the degreaser pit had not impacted underlying soils. The results of the September 1989 groundwater sampling and the October/November 1989 shallow aquifer pump test were presented. First Environment concluded that the principal source of TCE groundwater contamination appeared to be the alleyway where the waste oil tank had been located. First Environment concluded that the principal source of PCE contamination was from an off-site source located south of the Building 12 Property.

On January 12, 1990, NJDEP issued a letter requesting submittal of the groundwater sampling results (see First Amended Summary Report Attachment 2). The letter also provided a conditional approval of the August 1989 Sampling Plan Addendum. The

conditions included a requirement to resample the gasoline tank (Tank #5) excavation for VOCs analysis by EPA Method 624 and to remediate PHC contaminated soil at catch basin #2 of the storm sewer system.

2.3.2 Investigation Following Withdrawal from the New Jersey Environmental Cleanup Responsibility Act (ECRA) - Building 12 Property

Klockner continued to investigate sources of TCE contamination after withdrawing from ECRA. The activities conducted were directed toward identifying and delineating potential TCE and PCE source areas. The areas investigated included the degreaser pit area, the alleyway between the quonset hut and the Masden Industries leasehold, the quonset hut and the southwest loading dock area. A majority of the sampling activities involved the use of field screening for VOCs vapors with a Photovac 10S50 or 10S70 portable gas chromatograph (GC). Field screening was conducted in accordance with NJDEP's "Field Delineation of Volatile Contamination Using Ambient Temperature Head Space Analysis." The investigation was conducted by First Environment.

On July 24, 1990, soil samples for laboratory analysis were collected from the scale room and alleyway. The analytical results indicated the presence of VOCs. Metal chips were observed in the alleyway and sampled to identify the composition of the chips. The chips were identified as aluminum.

During December 1991 and January 1992, several rounds of soil vapor field sampling and soil samples for laboratory analysis were collected from the degreaser pit area, the alleyway, the quonset hut and scale room. The analytical results indicated the presence of VOCs in the soil gas samples collected from all four areas. The presence of VOCs were detected in the soil samples from all of the areas except the degreaser pit area.

2.3.3 Building 13 Property

Sampling has been conducted at the Building 13 Property as part of the RI/FSs for the Site, which were performed in 1986 and 1991 in connection with OU1 (SAIC, 1986)and OU2 (ICF, 1991a and b), respectively, and by NJDEP in 1986 during tank removal activities conducted by F.G. Clover.

A soil gas survey was conducted by Tracer Research Corporation during October 1985 as part of the OU1 RI/FS. One of the sixty-two locations sampled in this survey included the Building 13 Property. The results indicated that the Building 13 Property was a potential source of PCE groundwater contamination.

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A deep monitoring well (SAI-07) also was installed on Lot 8 of the Building 13 Property as part of the OU1 RI/FS. The well has been sampled several times as part of the OU1 and OU2 RI/FS activities. The contaminant of concern identified in this well was TCE. A shallow monitoring well (FG-1) was installed on the Building 13 Property in 1989 by F.G. Clover. Sampling of this well was conducted as part of the OU2 RI/FS. Both PCE and TCE were detected in FG-1.

During October 1986, F.G. Clover removed two underground heating oil tanks. The tanks had capacities of 500 and 1,000 gallons. NJDEP personnel visited the site on October 9, 1986 (NJDEP, 1986a). A 1,000 gallon dry well, which had been installed by F.G. Clover for its waste process water, was identified during the site visit. Process waste water was discharged to the dry well. NJDEP collected a sample from the dry well and from one of the excavated tanks for laboratory analysis. The analytical results indicated the presence of organic compounds, but no TCE or PCE was detected. The dry well was subsequently removed from service by F.G. Clover. The discharge to the dry well was routed to the Borough's sanitary sewer system and the dry well was filled with sand during May 1987. Monitoring well FG-1 was installed to investigate this area under NJDEP oversight. Mr. Iverson indicated that based on groundwater sample results, NJDEP did not require any further remedial activities. In April 1996, NJDEP was contacted concerning the status of the case associated with the dry well. NJDEP personnel indicated that the case was referred from NJDEP's Bureau of Field Operations to the Bureau of Federal Case Management (BFCM) approximately 4½ years ago. Donna Gaffigan of BFCM was contacted and indicated that the status of the case associated with the dry well was not readily available.

2.4 Klockner Property History

Detailed descriptions of the historical ownership and operations at the Klockner Property, and review of Sanborn Insurance Maps and aerial photographs are included in Sections 2.2, 2.3 and 2.4 of the First Amended Summary Report.

3.0 SUMMARY REPORT

3.1 Hazardous Substance Use at Klockner Property

Hazardous substances have been used in current and past operations at the Klockner Property. Information concerning hazardous substance use is presented in Section 3.1 of the First Amended Summary Report.

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3.2 Results of Previous Site Investigation Activities

The presence of soil contamination and groundwater contamination has been investigated at the Klockner Property through activities associated with the OU1 and OU2 RI/FSs, ECRA compliance at the Building 12 Property, investigation for the purpose of Rockaway Borough litigation at the Building 12 Property, and NJDEP investigations at the Building 12 and 13 Properties. The following areas of potential environmental concern were identified during the previous site investigation activities and recent site inspections conducted as part of this RI/FS:

Building 12 Property

- Underground Heating Oil Tanks
- Underground Gasoline Tank
- Underground Waste Oil Tank
- Storm Sewer System
- Leaching Pit
- Degreaser Pit
- Alleyway
- Scale Room
- Quonset Hut
- Loading Dock Area
- Groundwater
- Other

Building 13 Property

- Underground Heating Oil Tanks
- Dry Well
- Soil Gas Survey
- Groundwater
- Former Aboveground Oil Tanks
- Oil Storage Shed
- Scrap Metal Storage Shed
- Storm Drain
- Discharge Pipe
- Cooling Water Discharges
- Floor Drains
- Dumpster Pad

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A summary of the findings in each of the above areas is provided in Section 3.2 of the First Amended Summary Report. The locations of the areas listed above are indicated on Figures 3.1 and 3.2.

3.3 Summary of Areas Requiring Further Investigation

The sampling activities conducted at the Building 12 Property have resulted in identification of the alleyway and adjoining areas as a potential source of TCE and PCE groundwater contamination. The former drum storage area north of Building 12 remains to be investigated. The delineation of the VOCs contamination in the alleyway and adjoining areas is proposed as part of the RI/FS. A soil vapor survey will be conducted, followed by soil sampling. To satisfy outstanding NJDEP concerns, additional sampling will be conducted at the areas of the catch basin and Tank #5. Sampling also will be conducted at the former leach pit to verify if metals are present at levels of environmental concern. A soil gas survey will be conducted at the Building 13 Property to identify potential sources of TCE and PCE contamination.

The following is a synopsis of proposed activities to be undertaken during the RI/FS for the areas of potential environmental concern identified at the Klockner Property:

Building 12 Property

1. Heating Oil Tanks	NJDEP did not require any further action in this area based on the remediation conducted under ECRA. No further action is proposed for this area of potential environmental concern.
2. Underground Gasoline Tank	The collection and analysis of the samples requested by NJDEP will be conducted under the RI/FS.

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Building 12 Property

3. Waste Oil Tank	Sampling is proposed to investigate the horizontal extent of the chlorinated volatile organic compounds (CVOC) detected at a depth of 7 - 7.5 feet on the east and south sides of the former tank excavation. Tank #4 was located in an area where shallow TCE soil contamination also has been detected. Further investigation of this contamination is proposed (see Alleyway). Due to the presence of metals in the ground-water above the GWQS, investigation of this area will include analysis for metals.
4. Catch Basin/Storm Sewer	In accordance with N.J.A.C. 7:26E, a soil sample will be collected from the location with the highest PHC concentration, and tested for BNs and Metals analysis to determine if further remediation is warranted.
5. Leaching Pit	No further action was proposed to NJDEP for this area. However, it does not appear that any soil samples for BNs or Metals were collected from this area and the purpose of the pit was never determined. On December 14, 1988, the shallow groundwater in MW-6S was analyzed for BNs and Metals (FE, 1989a), and metals were detected at levels above the current NJDEP GWQS. Therefore, sampling for Metals in this area is proposed.

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Building 12 Property

6. Degreaser Pit	It does not appear that any further action is necessary in this area. However, the field sample results do not correlate well with the lab results, raising the question as to whether the soil sample delivered to the lab was properly handled. Therefore, a confirmatory sample for laboratory analysis is proposed for this area.
7. Alleyway	Shallow soil contamination has been detected in this area. Tanks #3 and #4 also were located in the alleyway. Additional soil sampling, consisting of a soil gas survey followed by soil sampling to define the limits of the contamination detected, is proposed. The soil gas survey will include other areas of concern located within the vicinity of the alleyway.
8. Scale Room	A scale is located in the center of the room. The underside of the scale will be inspected to determine if a drain is below it. Any sludge remaining there will be removed and properly disposed. Additional soil sampling to define the limits of the contamination detected in this area is proposed.
9. Quonset Hut	Additional soil sampling to define the limits of the contamination detected in this area is proposed.
10. Loading Dock	Previous investigation of this area did not indicate the presence of contaminants at levels of concern. No further investigation of this area is proposed.

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Building 12 Property

11. Groundwater Contamination	Investigation and remediation of the groundwater beneath the Building 12 Property is being conducted by Thiokol, and will not be addressed in the OU3 RI/FS for the Klockner Property.
12. Opening for Boiler Piping	NJDEP did not require any further investigation of this area and none is proposed.
13. Drum Storage Shed	Sampling is proposed to investigate this area.
14. Drum Storage in Alleyway	Sampling is proposed to investigate this area.
15. North Drum Storage Area	Soil gas followed by soil sampling, if indicated, is proposed to investigate this area.
16. Sump	Sampling is proposed to investigate this area.
17. Sanitary Discharges	No further investigation of this area is proposed.

Building 13 Property

1. Underground Heating Oil Tanks	The exact locations of the former tanks are not known. An NJDEP inspection report indicated the absence of any obvious soil contamination in the tank excavations. Soil gas samples are proposed in the vicinity of the former tank locations. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.

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Building 13 Property

2.	Dry Well	The drywell was taken out of service and filled with sand, and downgradient groundwater quality was investigated. The drywell had been installed by the current owner after groundwater contamination of the Site had been detected. No further investigation of this area is proposed, although a soil gas survey sample will be collected in the vicinity of this area as part of the investigation of source areas of TCE and PCE contamination.
3.	Soil Gas Survey	A soil gas survey to investigate potential sources of TCE and PCE contamination is proposed. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.
4.	Groundwater	Investigation and remediation of the groundwater beneath the Building 13 Property is being conducted by Thiokol, and will not be addressed in the OU3 RI/FS for the Klockner Property.
5.	Former Aboveground Oil Tanks	The collection of soil gas samples is proposed at the former tank locations to determine if they are source areas. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.
6.	Oil Storage Shed	The collection of a soil gas sample is proposed at the discharge pipe in this location. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.

Building 13 Property

7. Scrap Metal Storage Shed	The collection of a soil gas sample in this location is proposed to determine if it is a source area. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.
8. Storm Drain	The collection of a soil gas sample at the storm sewer catch basin is proposed to determine if it is a source area. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.
9. Pipe	The previous purpose of the pipe through the building wall is not known. The collection of a soil gas sample at this location is proposed to determine if it is a source area. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.
10. Cooling Water Discharges	The filtered contact cooling water discharged to the ground surface at Building 14 every 2 to 3 years is not considered significant enough to warrant investigation. However, the collection of a soil gas sample at this location is proposed. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.
11. Floor Drains	The collection of soil gas samples is proposed in the vicinity of the floor drains to determine if they are source areas. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.

Building 13 Property

12. Dumpster Pad	The collection of soil gas samples is proposed at this location to determine if it is a source area. Soil sampling will be conducted if the presence of contamination is indicated by the soil gas survey.

3.4 Acceptability of Existing Data

A review of the existing data indicates that it was generated by following the appropriate NJDEP procedures required at the time of sampling. Soil samples, except where noted, were analyzed by a New Jersey certified laboratory using EPA analytical methods as required by NJDEP.

The existing laboratory data is acceptable for the purpose of identifying areas requiring either further investigation or no further investigation. The existing soil gas data is acceptable for determining the location of potential sources of VOCs contamination and to guide any further sampling activities.

4.0 RI/FS SCOPE OF WORK

This section provides an evaluation of impacts on potential receptors, preliminary identification of remedial alternatives, a preliminary identification of applicable or relevant and appropriate requirements (ARARs) that will be used as guidance during development and evaluation of remedial alternatives, a summary of the RI objectives, data requirements and data quality objectives (DQO).

4.1 Evaluation of Impacts on Potential Receptors

4.1.1 Exposure Pathways

Potential exposure pathways for contamination with chlorinated hydrocarbons at the Klockner Property include the following:

- Vapor emissions

- Direct physical contact
- Ground Water
- Surface Water

4.1.2 Impacts from Vapor Emissions

The results of soil gas data indicated that further examination of potential occupational health risks was warranted based upon possible emission of VOCs into the atmosphere. We have concluded that because of the low soil gas concentration and lack of exposure potential, these soil gasses pose no health risk.

The highest soil gas reading at the Klockner Property was 96 ppm for TCE and 97 ppm for PCE at the degreaser pit area of Building 12. The OSHA-permissible exposure limits (PEL) for TCE and PCE are 100 ppm, based on a time weighted average (TWA) for breathing zone concentrations during an 8-hr work day maintained for a 40-hr work week. NIOSH considers TCE and PCE to be potential occupational carcinogens.

The soil gas results are from samples collected from beneath the concrete floor in the degreaser pit area, where vapor concentrations were confined due to the low gas permeability of concrete, reducing the rate of diffusion of gases like TCE and PCE into the atmosphere. The soil gas results for TCE and PCE were obtained by drawing air through the soil with a pump. Natural diffusion rates of TCE and PCE from soil into the atmosphere would be much slower, even without the concrete covering. In addition, concentrations of soil vapors such as TCE and PCE measured in this manner will be greatly reduced when released to the atmosphere and mixed with atmospheric gases.

Therefore, it is very unlikely that the resulting soil gas concentrations would produce average concentrations in the breathing zone that would exceed the OSHA criterion of 100 ppm for each contaminant. Additionally, the TCE and PCE soil gas concentrations detected are well below the NIOSH immediately dangerous to life or health (IDLH) values of 1,000 ppm and 150 ppm, respectively. The IDLH value is considered to be a concentration beyond which a 30-min exposure would have irreversible health effects to humans.

There is no potential for exposure from the soil gas at Building 12 because the building was built on concrete slabs and all of the parking lots around the buildings are paved. The potential for exposure to soil gas at the Building 13 Property cannot be assessed until data is available from the proposed RI/FS activities.

4.1.3 Impact from Direct Contact

The potential for a direct contact with contaminated soils and ground water at the Building 12 Property is limited due to the presence of the building and the asphalt cover over the majority of the area. A comparison of the historic soil sampling data to the current NJDEP Soil Cleanup Criteria indicates that contaminant levels present in the soil at the Building 12 Property are below the current residential soil cleanup criteria.

Building 13 contains a large unpaved area which is covered with vegetation. The potential for direct contact with contaminated soils exists if contamination is present in the surface soil. Such contact may come about through lawn care activities. This is probably unlikely due to the age of the potential discharge and volatile nature of the primary contaminants of concern.

Since the area is fully developed, no construction activities involving subsurface excavation are planned in the foreseeable future. There is a potential, however, for some utility work/repairs on the utility lines running through the Klockner Property. Direct contact exposure to contaminated soil, during such utility works, if any, is likely to be of a short-term character and therefore of minimal concern.

4.1.4 Impact on Ground Water System

4.1.4.1 Impact on Shallow Ground Water

The shallow ground water appears to have been impacted by contaminant discharges from the Klockner Property. The shallow ground water is present above a silty-clay confining unit. There is the potential for the presence of residual dense non-aqueous phase liquids (DNAPL) below the water table which may continue to impact shallow groundwater. The remediation of the shallow groundwater is being conducted by Thiokol.

4.1.4.2 Potential for Deeper Ground Water Contamination

The deep groundwater has been impacted by contaminant discharges. The deeper ground water system occurs within glacial till including silt, sand, coarse gravel, cobbles and boulders. The deeper groundwater is used for public water supply in Rockaway Borough. The remediation of the deeper groundwater is being conducted by Thiokol.

4.1.5 Impact on Surface Water

Stormwater runoff is discharged from the Klockner Property to the municipal storm sewer system. The municipal storm sewer system discharges to a drainage ditch at the former Morris Canal. The drainage ditch discharges to the Beaver Brook which flows into the Rockaway River.

It is highly improbable that surface water runoff from the Klockner Property is adversely impacting surface water bodies. A majority of the Klockner Property is either covered with buildings, asphalt or vegetation. The main contaminants of concern are volatile and, due to the age of the suspected discharge(s), are not likely present at levels that could impact stormwater runoff. Surface water and sediment samples collected from the Rockaway River and Beaver Brook under the OU1 RI/FS did not indicate the presence of the main contaminants of concern. The results of the OU2 RI/FS also indicate that migration of contaminants from the groundwater to the Rockaway River and other surface water bodies in the area was unlikely. Under the conditions existing in 1991, the pumping of groundwater from the well field was inducing river water and other nearby surface water to recharge to groundwater.

Based on the information presented above, it is concluded that the impact of discharges of stormwater runoff and contaminated ground water originating from the Klockner Property on surface water are negligible to non-existent.

4.2 Identification of Remedial Alternatives

4.2.1 Source Area Characterization and Remediation Difficulties

In view of the presence of chlorinated solvents in the soil and groundwater at the Klockner Property, and the current understanding of problems posed by chlorinated hydrocarbon contamination at other sites, the Klockner Property may need to be considered a potential DNAPL site. At DNAPL sites, areas containing droplets, blobs or pools of chlorinated product beneath the water table provide a source for continued generation of dissolved plume through contact with moving ground water. Although there is no indication that pool(s) of free waste solvents may be present at the Klockner Property, there is potential that residual blobs and droplets of waste solvents may be present in the source area below the water table. In this context, control or mitigation of the source area may be necessary to mitigate the dissolved plume. Klockner is responsible for the RI/FS activities associated with the soil column above the water table, which shall not extend below the lowest water level measurements taken on or before January 16, 1991, and investigation of

DNAPL below the water table is beyond the scope of Klockner's responsibility under the AOC.

Several site-specific problems may hamper source area delineation and remediation efforts at the Klockner Property. These include:

- A portion of the potential source area at Building 12 appears to be located under the building structure. This possibility is suggested by the results of soil gas survey and soil samples collected by First Environment (see Figures 3.17 and 3.18 in the First Amended Summary Report). Furthermore, based on the current NJDEP Soil Cleanup Criteria which include residential, non-residential and impact to ground water soil cleanup criteria, no contamination has been detected above the residential soil cleanup criteria in the remaining known contaminated areas, and only moderate concentrations of chlorinated compounds were detected at levels above the impact to groundwater soil cleanup criteria in soil samples collected outside the building in the alleyway area. This is an indirect indication that the source area may be either located under the building (i.e. the scale room funnel area) or the remaining source is weak in terms of concentrations.

- The source area contamination that generates the dissolved plume most likely is located at or below the water table, which is beyond the scope of Klockner's responsibility under the AOC.

- Any soil delineation and remediation measures must consider the presence of underground utility mains (gas, water, and sewer) running through the Klockner Property and through any potential source areas.

4.2.2 Remedial Alternatives for the Source Area

Partial source control measures already implemented/existing at the Klockner Property include: 1) excavation of contaminated soil from above the water table and 2) partial capping of potential source area(s) with an asphalt and building cover. These measures have likely reduced the flux of dissolved contaminated from the source area(s) located above the water table. However, contamination possibly present under the building may remain unmitigated.

Table 1 summarizes the preliminary remedial source control alternatives considered for the Klockner Property. Some of these alternatives are not feasible due to site-specific problems (contamination under the building) and high implementation costs. It appears that

none of these alternatives or their combinations is capable of achieving a high degree of removal of contamination from the source area at a reasonable cost.

Soil vapor extraction (SVE) is a presumptive remedy available for the VOC contamination at the Klockner Property. Additional site specific information will have to be obtained to determine the appropriateness of this remedy to the site conditions.

Nevertheless, it may be possible to mitigate the source area located outside the building using excavation or vapor extraction, and the source area(s) located beneath the building using vapor extraction. Also, the use of engineering and institutional controls may be appropriate based upon contaminant levels and site conditions. The use of any of these methods needs to be preceded by an additional investigation to delineate the contaminated source area and to obtain parameters necessary for the final selection and design of the remedial action.

4.3 Determination of Applicable or Relevant and Appropriate Requirements (ARARs)

The Superfund Amendments and Reauthorization Act (SARA) emphasizes selection of permanent remedies which ensure protection of human health and the environment. The criteria mandated by SARA for making these decisions are known collectively as applicable or relevant and appropriate requirements, or ARARs. SARA (Section 121) defines an ARAR as:

- Any standard, requirement, criterion, or limitation under Federal environmental law; or

- Any promulgated standard, requirement, criterion, or limitation under a state environmental or facility siting law that is more stringent than the associated Federal standard, requirement, criterion, or limitation.

The purpose of ARARs is to ensure that response actions are consistent with other pertinent federal and state requirements for public health and environmental protection that would be legally required or applicable in sufficiently similar circumstances to those encountered at hazardous waste sites. In addition, SARA now requires that state ARARs be considered during the assembly of remedial alternatives if they are more stringent than Federal requirements. EPA has also indicated that "other" criteria, advisories, and guidelines must be considered in evaluating remedial alternatives. ARARs are categorized, using current EPA practice, as contaminant-specific, location-specific, and action-specific.

A list of potential Federal and State of New Jersey ARARs for the site is given in Table 2. The values identified as criteria under each of the statutes will be evaluated in the RI/FS according to their appropriateness, relevance, and applicability to the evaluation process.

In accordance with New Jersey Department of Environmental Protection's February 3, 1994 Soil Cleanup Criteria guidance document (Appendix 1), the potential soil cleanup objectives for the primary contaminants identified at the Klockner Property are listed below in parts per million (ppm).

Contaminant	Health Based Residential Soil Cleanup Criteria	Health Based Non-Residential Soil Cleanup Criteria	Impact to Ground Water Soil Cleanup Criteria
Tetrachloroethene (PCE)	4 ppm	6 ppm	1 ppm
Trichloroethene (TCE)	23 ppm	54 ppm	1 ppm
t-1,2-Dichloroethene (tDCE)	1,000 ppm	1,000 ppm	50 ppm

A comparison of the Building 12 historic soil sampling data to the NJDEP Soil Cleanup Criteria indicates that contaminant levels present in the soil at the Building 12 Property are below the residential soil cleanup criteria. However, contaminant levels are present above the impact to groundwater soil cleanup criteria in several locations.

4.4 Summary of RI/FS Objectives

Based on the available information on the Klockner Property, as presented in the First Amended Summary Report, the primary objectives of the RI/FS at the Klockner Property are to:

1. Identify, characterize, and delineate potential source areas of soil and groundwater contamination at the Building 12 portion of the Klockner Property. This will include the filling of data gaps in areas identified through previous sampling, and investigation of new areas as identified in the First Amended Summary Report.

2. Identify, characterize and delineate potential source areas of TCE and PCE groundwater contamination at the Building 13 portion of the Klockner Property.

3. Supplement the geological characterization of the site by collecting select soil samples for grain size analysis and organic carbon content.

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4. Satisfy outstanding sampling requirements identified by NJDEP in its comments dated January 12, 1990.

In conjunction with previously collected data, the collected information will be used to:

- conduct a Risk Assessment (by USEPA);
- conduct an evaluation of potential remedial alternatives;
- aid in estimating the volumes of impacted soil.

4.5 Data Requirements

Because of the existing data gaps identified, additional site specific information must be obtained and evaluated. The RI tasks proposed in this RI/FS Work Plan are designed to ensure that the RI/FS objectives are met. The remedial investigation will focus on identifying source areas of soil and groundwater contamination (above the water table) and characterizing and delineating these areas. The data obtained will be used to evaluate the health risk posed by the contamination and potential remedial alternatives.

Building 12 Property

Sampling and analysis is described in Section 5.3.1.1. Based on the Summary Report, additional sampling is necessary to fill data gaps with respect to contaminated soils found in the Building 12 Alleyway area. This would include the Scale Room and Quonset Hut areas. Additional soil sampling is required at the former underground gasoline tank (Tank #5), catch basin/storm sewer, leaching pit and degreaser pit to confirm that no further actions are required based on previous sampling results. Soil sampling is proposed at the former shed location, former drum storage area, and sump area, to determine if soil contamination is present.

Soil gas sampling will be conducted as part of the RI due to the volatile nature of the primary contaminants of concern at the Building 12 Property. The information obtained will be used to locate and define TCE and PCE contaminated soil areas. The appropriate soil samples will be collected to confirm the soil gas results as indicated.

Four soil samples will be collected for total organic carbon analysis and grain size distribution. Additional samples may be collected based on field observations. This information will be used in evaluating remedial alternatives.

Air monitoring will be conducted during all field activities as part of the health and safety plan.

Building 13 Property

Sampling and analysis is described in Section 5.3.1.2. Based on the Summary Report, sampling is necessary to identify potential source areas of TCE and PCE contamination detected in the ground water. A soil gas survey will be conducted to identify potential source areas followed by confirmatory soil sampling as indicated. Additional soil sampling may be necessary to characterize and delineate any source areas identified.

Soil samples will be collected for total organic carbon analysis and grain size distribution. The number of samples collected will depend on the results of the soil gas survey. This information will be used in evaluating remedial alternatives.

Air monitoring will be conducted during all field activities as part of the health and safety plan.

4.6 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions made during site-related activities. DQOs are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality. There are five analytical levels that address various data uses and the QA/QC effort and methods required to achieve the desired level of quality. These levels are:

- Level I - Field Screening: This level is characterized by the use of field instruments and field chemical kits which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Level I data can be used in refining sampling plans and determining the extent, presence, or absence of chemical constituents at a site.

- Level II - Field Analysis: Level II field analyses are characterized by the use of portable analytical instruments which can be used on site or in mobile laboratories stationed near a site (close-support labs). Qualitative and quantitative data can be obtained, depending upon the types of contaminants, sample matrix, and personnel skills. Level II data are used to provide "quick turnaround" results for on-going

field activities or where initial data will provide information for further investigation.

- Level III - Laboratory Analysis using Methods other than the Contract Laboratory Program (CLP) Routine Analytical Services (RAS): This level involves the use of standard USEPA-approved procedures. Some procedures may be equivalent to CLP RAS containing the same rigorous QA/QC protocols as used in Level IV analyses, but without the CLP requirements for documentation. Some Level III data are used for site characterization, environmental monitoring, confirmation of field data, and to support engineering studies. Level III analyses can be used to provide data for risk assessment requirements.

- Level IV - CLP RAS: This level is characterized by rigorous QA/QC protocols and documentation and provides qualitative and quantitative analytical data. The use of SW-846 methods with CLP requirements for documentation provides a Level IV equivalent data package. Level IV data are typically used for the confirmation of lower level data, risk assessment, and in obtaining highly documented data.

- Level V - Non-Standard Methods: Analyses which may require method modification and/or development. CLP and Special Analytical Services (SAS) are considered Level V. Level V support is used to provide data that cannot be obtained through standard methods. Analysis of samples at this level may involve research, development, and documentation of a new method or the modification of an existing method.

Level III data management will be utilized by Whitman for soil samples collected for laboratory analysis. Level III data has been selected because the assessment data will be utilized for site characterization, confirmation of field data, risk assessment and evaluation and design of remedial alternatives.

A soil gas survey will be conducted to identify potential source areas of previously detected chlorinated organic compounds and will represent analytical Level II. The results obtained will be used to identify locations requiring further investigation through sampling for laboratory analysis by Level III. Samples for grain size analysis and total organic carbon for use in remedial alternative evaluation will represent analytical level III. Total Organic Vapor Detection using portable field instrumentation will represent analytical Level I.

The DQOs have been determined in accordance with applicable USEPA guidance documents.

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5.0 TASK DESCRIPTIONS FOR THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY

This section presents a description of each task to be performed during the RI/FS at the Klockner Property. The RI/FS consists of the nine standard RI/FS tasks identified in the SOW and described in EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01, October, 1988 (USEPA, 1988a) and includes:

Task 1 - Scoping (Summary Report, RI/FS Work Plan, Field Operations Plan, Site Management Plan)
Task 2 - Community Relations
Task 3 - Characterization of the Klockner Property (Field Investigation, Data Analysis, Data Management, Monthly Progress Reports, Characterization Report)
Task 4 - Identification of Candidate Technologies
Task 5 - Treatability Studies
Task 6 - EPA's Baseline Risk Assessment
Task 7 - Remedial Investigation Report
Task 8 - Remedial Action Objectives and Screening of Remedial Alternatives
Task 9 - Feasibility Study Report

A description of the scope of work for each task is presented in the following sections.

5.1 Task 1 - Scoping

Task 1 activities include the following subtasks:

1.1 RI/FS Work Plan Preparation consisting of:

Kick-off Meeting
Site Visit
RI/FS brainstorming session
Collection and review of existing data
Preliminary Risk Assessment
Preliminary Identification of Remedial Alternatives
Scoping Meetings
Data quality objectives determination
Determination of ARARs

1.2 Summary Report

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1.3 Draft Field Operations Plan (FOP) including:

Sampling and Analysis Plan (SAP)
Quality Assurance Project Plan (QAPP)
Health and Safety Plan (HASP)

1.4 Site Management Plan (SMP)

5.1.1 Subtask 1.1 - Work Plan

This Work Plan describes the activities required to identify sources of groundwater contamination, delineate the extent of soil contamination, assess the public health risks, and evaluate appropriate remedial action alternatives for soil and sources of groundwater contamination. The Work Plan defines the scope of work, level of effort, costs and schedule associated with each RI/FS work task.

5.1.2 Subtask 1.2 - Summary Report

A draft Summary Report was prepared and submitted to EPA on December 6, 1995. A First Amended Summary Report, incorporating EPA's March 21, 1996, comments, is being submitted concurrently with this RI/FS Work Plan. The Background and Summary Report sections of the First Amended Summary Report set forth the site description, including the geographic location of the property; a synopsis of the Klockner Property's history and a description of previous response activities conducted at the Klockner Property by local, state, federal or private parties; and a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the Klockner Property.

5.1.3 Subtask 1.3 - Field Operations Plan

The Field Operations Plan (FOP) is a stand-alone document being submitted concurrently with this Work Plan. The FOP is composed of three main sections:

- Sampling and Analysis Plan (SAP) The SAP details sampling and analytical objectives; the number, location, and rationale for each media samples; site specific quality assurance requirements; detailed sampling and analysis procedures; decontamination of sampling equipment procedures; and data management elements.

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- Quality Assurance Project Plan (QAPP) The QAPP summarizes data usage, analytical parameters, and QA/QC requirements for sample collection and analyses.

- Health and Safety Plan (HASP) The HASP includes: site-specific health and safety information, a hazard assessment, training requirements, health and safety monitoring procedures and personnel decontamination and disposal procedures. The HASP will be updated on a subtask-specific basis as needed.

5.1.4 Subtask 1.4 - Site Management Plan

The Site Management Plan (SMP) was prepared and submitted to EPA on October 19, 1995, in accordance with the SOW. The SMP provides a description of the site management team for Operable Unit #3 at the Klockner Property.

Task 1 will be complete following EPA's approval of the final RI/FS Work Plan, the Summary Report and the FOP.

5.2 Task 2 - Community Relations

Community relations will be the responsibility of the EPA. Klockner's representatives will assist EPA as needed in addressing any concerns or questions by the public in connection with this site. Possible activities associated with assisting EPA include, but are not limited to, the following:

- Attend public meetings.

- Provide information to EPA concerning possible questions, issues and concerns citizens have about the project.

5.3 Task 3 - Characterization of the Klockner Property

The characterization will provide for the conduct of the field investigation activities proposed in the RI/FS Work Plan and FOP. The purpose of the field investigation activities will be to implement and document field support activities, investigate and define site physical and biological characteristics, define sources of contamination, and describe the nature and extent of contamination. In addition, this task includes provisions for data analysis, data management procedures, and preparation of monthly Progress Reports and a Characterization Summary Report.

5.3.1 Subtask 3.1 - Field Investigations

The field investigation at the Klockner Property will consist of the following subtasks:

Subtask 3.1.1 - Soil Gas Survey, Soil Borings and Soil Sampling - Building 12

Subtask 3.1.2 - Soil Gas Survey, Soil Borings and Soil Sampling - Building 13

This section describes the objective of each subtask, and summarizes the scope of each subtask. For each subtask, the proposed soil gas surveys will be conducted initially, followed by soil sampling as needed. This work will be performed in accordance with the New Jersey Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

5.3.1.1 Subtask 3.1.1 - Soil Gas Survey, Soil Borings and Soil Sampling - Building 12

The scope of this subtask includes the collection of subsurface soil gas and soil samples to identify and evaluate potential source areas within the study area. The proposed sample locations are indicated on Figures 5.1 and 5.2. Sample designations are listed in Tables 3A and 3B.

A total of approximately 40 soil gas sampling locations will be field screened using a gas chromatograph (GC) for the presence of contamination. Based on the results, soil samples will be collected and analyzed as warranted.

Soil samples will also be collected for area specific parameters from eleven (11) potential areas of environmental concern. Locations were selected to provide representative coverage of the specific potential Areas of Environmental Concern (AECs) identified and the characterization of these areas.

Soil gas survey samples will be collected and analyzed for one of the following parameters depending on the AEC:

- GC Purgeable Halocarbons (PHAL) by EPA Method 8010;
- GC Volatile Organics Compounds by EPA Methods 8010 & 8020.

The soil samples will be collected and analyzed for all or certain of the following parameters, depending on the AEC:

- GC Purgeable Halocarbons (PHAL) by EPA Method SW-846 8010;

- GC/MS Volatile Organic Compounds with +10 Library Search (VOCs) by EPA Method SW-846 8240;
- GC/MS Base/Neutral Extractable Organic Compounds with +15 Library Search (BNs) by EPA Method SW846 8270;
- Target Analyte List (TAL) Metals by appropriate EPA Methods SW-846 6010 & 7000; and
- Cyanide as specified in the CLP SOW Methodology for Inorganic Analysis Multi-Media, Multi-Concentration, document ILM03.0;
- Petroleum Hydrocarbons (PHC) by EPA Method 418.1 modified for soils.

Soil gas samples will be collected from 1/2 inch holes created by using a manual slide hammer or drive rod. Soil samples for laboratory analysis will be collected using a push sampling devise, such as a Geoprobe. In some areas, a hole will have to be drilled through concrete to allow for sample collection. Hand augers will be used to collect samples from areas not accessible by larger sampling equipment. Each six-inch interval will be visually examined for the presence of residual staining and screened with a PhotoVac TIP. When a predetermined depth has not been identified for analysis by prior sampling in AECs, the interval with obvious staining or with the highest PhotoVac TIP reading will be selected for laboratory analysis. During soil boring installation, the types of soils encountered will be recorded in order to evaluate contaminant migration and evaluate remedial alternatives. In order to supplement the geological characterization of the site, four (4) soil samples will be collected for grain size analysis and organic carbon content. Additional samples for these analyses may be collected based on field observations of subsurface soil types.

Field Blanks will be collected at the rate of one per day or at a rate of 10% of the total number of samples collected throughout the event. Trip Blanks will not be collected for a non-aqueous matrix. Duplicate samples are to be included for each matrix at a minimum rate of one for every twenty samples and be submitted to the lab as "blind" samples. If less than twenty samples are collected during a particular sampling episode, one duplicate will be performed.

Sampling will be conducted as detailed below:

1. Underground Gasoline Tank

Post-excavation soil samples collected previously from the gasoline tank (Tank #5) excavation were analyzed for VOCs by EPA Method 503.1. This method for VOCs was not acceptable to NJDEP. Although the results were none detected, NJDEP required additional sampling using EPA Method 624. The collection and analysis of two soil samples for

Volatile Organic Compounds + 10 (VOC) will be conducted to satisfy NJDEP's January 12, 1992 comments. The samples will be collected from beneath the tank fill material along the former tank center line.

2. Waste Oil Tank

The 1,000 gallon underground waste oil tank (Tank #4) was located in the alleyway. The tank was excavated under ECRA. Two soil samples will be collected to investigate the horizontal extent of the chlorinated volatile organic compounds (CVOC) formerly detected at a depth of 7 - 7.5 feet on the east and south sides of the former tank excavation. Based on the previous analytical results obtained under the ECRA program, the samples collected at this AEC will be analyzed for Purgeable Halocarbons (PHAL). One of the samples will include analysis for TAL Metals, due to the presence of metal contamination in the ground water in this area at levels above NJDEP's Ground Water Quality Standards (GWQS).

Shallow TCE soil contamination has also been detected in this area (see Item 7 Alleyway) and the proposed samples will also be used for the investigation of the Alleyway.

3. Catch Basin/Storm Sewer

Seventeen soil samples for PHC and VOCs analysis were collected from soil within a foot below the invert of the three (3) catch basins and connecting storm sewer lines under ECRA. One location contained VOCs in excess of 1 ppm. This location was remediated by excavating to a clean zone. Another location (SS-8) along the sewer line contained PHC at a concentration of 3,000 ppm. A soil sample will be collected from previous sample location SS-8 for Base/Neutral Extractable Organic Compounds + 15 (BNs) and TAL Metals analysis to determine if further remediation is warranted in accordance with N.J.A.C. 7:26E. The sample will be collected from a depth of 2 - 2.5 feet.

4. Leaching Pit

VOCs contaminated soil was excavated from the leaching pit under ECRA. Soil samples collected were only analyzed for VOCs. A groundwater sample collected from adjacent monitoring well MW-6S indicated the presence of metals contamination at levels above the current NJDEP Groundwater Quality Standards (GWQS). Therefore, a sample will be collected from previous sample location SS-25 for TAL Metals. The sample will be collected from a depth of 12 - 12.5 feet.

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5. Degreaser Pit

Two (2) soil samples collected from beneath the degreaser pit under ECRA were none detected for VOCs. A soil gas survey was subsequently conducted and indicated a plume of vapor phase VOCs in the soil beneath the floor in the area adjacent to the degreaser pit. Two (2) soil samples were collected at a depth of 2.5-3 feet below the floor in the location showing high vapor readings in the vapor plume area. The samples were analyzed for VOCs. TCE and PCE were detected at levels below the applicable NJDEP soil cleanup criteria. A soil sample will be collected for PHAL analysis from the area showing the highest soil gas concentrations during the previous soil gas survey (soil gas samples VD-13 and VD-14). The sample will be collected from a depth of 2.5-3 feet.

6. Alleyway

This area will include the alleyway, adjacent quonset hut and indoor area between the alleyway and degreaser pit. CVOCs were detected in the soil and soil gas in this area during previous sampling events. As the VOC contaminants previously detected consist of chlorinated compounds, soil gas samples for PHAL analysis in a mobile laboratory will be collected from this area. Approximately 20 to 30 samples will be collected from a grid. One (1) sample will be collected from each location from a depth of 3 feet. The sample grid will be set up as indicated in Figure 5.1. The results of the soil gas survey will be evaluated to determine the appropriate locations for soil samples to characterize and delineate the VOCs contamination. It is anticipated that up to seven (7) boring locations will be installed to collect soil samples for laboratory analysis. Samples will be collected from a minimum of two (2) depths from the borings. The sample collection depths will be determined by field screening with a portable photoionization detector.

7. Scale Room

A scale is located in the center of the room. The underside of the scale will be inspected to determine if a drain is located below it. Any sludge found will be removed and properly disposed. Soil gas samples will be collected in this area as part of the soil gas survey for the Building 12 Property. The results of the soil gas survey will be used to select soil sample locations for horizontal delineation of the VOC contamination previously detected. Three (3) borings will be installed to collect soil samples to define the limits of the CVOC contamination previously detected in this area. One (1) boring will be installed at the location of prior sample "Funnel Area" to define the vertical extent of the CVOC contamination. A sample will be collected at a depth determined by field screening for laboratory analysis. The other two (2) boring locations will be based on the soil gas survey.

A soil sample will be collected from these two borings at a depth just below the concrete floor to define the horizontal limits of the contamination. The soil samples will be analyzed for PHAL.

8. Quonset Hut

See Item 6, Alleyway.

9. Drum Storage Shed

A soil sample will be collected from the soil below the location of the former drum storage shed to determine if contamination has resulted from the historic storage of chemicals. The sample will be analyzed for PHCs, VOCs, BNs, and TAL Metals. The sample will be collected from a depth of 0 to 6 inches below paving material. The sample for VOCs analysis will be collected from a six inch interval at a location between 0 to 2 feet below grade to be determined by field screening.

10. Drum Storage in Alleyway

A soil sample will be collected from the soil below the reported location of the spilled material (cyanide containing solution and lead tin solution) resulting from historical drum storage in the alleyway. The sample will be analyzed for TAL Metals and Total Cyanides. The sample will be collected from a depth of 0 to 6 inches below paving material.

11. North Drum Storage Area

A soil gas survey will be conducted to determine if VOCs have been discharged in this area. The soil gas samples will be field analyzed for VOCs. The soil gas sample grid will be setup as indicated in Figure 5.1. The soil gas samples will be collected from a depth of 3 feet and field analyzed for VOCs.

Soil samples for laboratory analysis will be collected from one to two locations based on the soil gas survey results. The soil sample will be analyzed for PHCs, VOCs, and TAL Metals. The sample will include analysis for BNs if PHC contamination is detected above 100 mg/kg. This soil sample(s) will be collected from a depth of 0 to 6 inches below paving material. The sample for VOCs analysis will be collected from a six inch interval at a location between 0 to 2 feet below grade to be determined by field screening with a photoionization detector.

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12. Sump

A soil sample will be collected from a depth of 1 to 1.5 feet below the sump invert to verify the sump's integrity. The soil sample will be analyzed for PHCs, VOCs, and TAL Metals. The sample will include analysis for BNs if PHC contamination is detected above 100 mg/kg.

5.3.1.2 Subtask 3.1.2 - Soil Gas Survey, Soil Borings and Soil Sampling - Building 13

A total of between 40 and 60 soil gas sampling locations will be field screened for the presence of contamination and soil samples will be collected and analyzed as warranted. Locations were selected to provide representative coverage of the specific AECs identified and the characterization of these areas. The proposed soil gas sample locations are indicated on Figure 5.3. Sample designations are listed in Tables 3A and 3B.

The soil gas survey samples will be collected and analyzed for the following parameters:

- GC Purgeable Halocarbons by EPA Method 8010.

If soil sampling is necessary, the samples will be collected and analyzed for all or a portion of the following parameters depending on the AEC:

- GC Purgeable Halocarbons by EPA Method SW-846 8010;
- GC/MS Volatile Organic Compounds with +10 Library Search by EPA Method SW-846 8240;
- GC/MS Base/Neutral Extractable Organic Compounds with +15 Library Search by EPA Method SW846 8270;
- Target Analyte List Metals by appropriate EPA Methods SW-846 6010 & 7000; and
- Petroleum Hydrocarbons (PHC) by EPA Method 418.1 modified for soils.

Soil gas samples will be collected from 1/2 inch holes created by using a manual slide hammer or drive rod. Soil samples for laboratory analysis will be collected using a push sampling devise, such as a Geoprobe. In some areas, a hole will have to be drilled through concrete to allow for sample collection. Hand augers will be used to collect samples from areas not accessible by larger sampling equipment. Each six-inch interval will be visually examined for the presence of residual staining and screened with a PhotoVac TIP. When a predetermined depth has not been identified for analysis by prior sampling, the interval with obvious staining or with the highest PhotoVac TIP reading will be selected for laboratory analysis. During soil boring installation, the types of soils encountered will be

recorded in order to prepare a geologic cross-section of the property, evaluate contaminant migration and evaluate remedial alternatives. In order to supplement the geological characterization of the site, samples will be collected for grain size analysis and organic carbon content. The number of samples collected for these analyses will be based on the results of the soil gas survey.

Field Blanks will be collected at the rate of one per day or at a rate of 10% of the total number of samples collected throughout the event. Trip Blanks will not be collected for a non-aqueous matrix. Duplicate samples are to be included for each matrix at a minimum rate of one for every twenty samples and be submitted to the lab as "blind" samples. If less than twenty samples are collected during a particular sampling episode, one duplicate will be performed.

Sampling will be conducted as detailed below:

1. Underground Heating Oil Tanks

The exact location of the two former underground heating oil tanks is not known. Soil gas samples will be collected in the vicinity of the location of the two underground tanks. The samples will be collected as part of the soil gas survey described below. If the soil gas survey indicates that a tank location is a potential source area, then a soil sample will be collected for PHAL laboratory analysis. The sample would be collected from beneath tank fill material if encountered.

2. Soil Gas Survey

A soil gas survey will be conducted to identify potential source areas for TCE and PCE contamination previously detected in soil gas and ground water samples collected at the Building 13 Property. Sample analysis will be for Volatile Organic Compounds in a field laboratory. The samples will be collected from a property-wide sampling grid with nodes spaced at 50 feet intervals. Samples will be placed near potential areas of concern where applicable. The samples will be collected from a depth of 4 feet. The sample grid and proposed sample locations are presented in Figure 5.3.

If the results of the site-wide soil gas survey indicate the presence of PHAL, further soil gas sampling will be conducted in the areas with the highest soil gas concentrations. A grid will be established and soil gas samples will be collected at two (2) depths to be determined in the field. The soil gas samples will be analyzed for PHAL.

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Soil samples will be collected from any potential source area identified through the soil gas survey. Sample depth and frequency will be dependent on site conditions.

3. Former Aboveground Oil Tanks

Soil gas samples collected as part of the site-wide soil gas survey will be collected from the locations of the three former aboveground storage tanks. If soil gas samples indicate the presence of contamination in a former tank location, a soil sample for PHAL laboratory analysis will be collected. The sample depths will be based on field screening results.

4. Oil Storage Shed

A soil gas sample collected as part of the site-wide soil gas survey will be collected at the discharge point of the pipe from the oil storage shed. If soil gas samples indicate the presence of contamination in this area, a soil sample for PHAL laboratory analysis will be collected. The sample depth will be based on field screening results.

5. Scrap Metal Storage Shed

A soil gas sample collected as part of the site-wide soil gas survey will be collected at the scrap metal storage shed area. If soil gas samples indicate the presence of contamination in this area, a soil sample for PHAL laboratory analysis will be collected. The sample depth would be based on field screening results.

6. Storm Drain

A soil gas sample collected as part of the site-wide soil gas survey will be collected at the location of the storm drain catch basin. If soil gas samples indicate the presence of contamination in this area, a soil sample for PHAL laboratory analysis will be collected. The sample depth would be based on field screening results.

7. Pipe

A soil gas sample collected as part of the site-wide soil gas survey will be collected at the location of the pipe through the east wall of Building 13. If soil gas samples indicate the presence of contamination in this area, a soil sample for PHAL laboratory analysis will be collected. The sample depth would be based on field screening results.

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8. Cooling Water Discharge

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A soil gas sample collected as part of the site-wide soil gas survey will be collected at the cooling water discharge area east of Building 14. If soil gas samples indicate the presence of contamination in this area, a soil sample for PHAL laboratory analysis will be collected. The sample depth would be based on field screening results.

9. Floor Drains

Floor drains are located in the vibratory cleaner area, basement bathroom and hydroform press at south end of Building 13. Soil gas samples collected as part of the site-wide soil gas survey will be collected in the vicinity of the floor drains. If soil gas samples indicate the presence of contamination near the floor drains, a soil sample(s) for PHAL laboratory analysis will be collected. The sample depth would be based on field screening results.

10. Dumpster Pad

A soil gas sample collected as part of the site-wide soil gas survey will be collected at the down slope side of the dumpster pad. If soil gas samples indicate the presence of contamination in this area, a soil sample for PHAL laboratory analysis will be collected. The sample depth would be based on field screening results.

5.3.2 Subtask 3.2 - Data Analysis

Data obtained in Subtask 3.1 will be assembled, reviewed, and carefully evaluated to satisfy the objectives of the investigation. The data evaluation task will be performed concurrently with Tasks 3.1 and 3.3 to ensure timely completion of the RI/FS.

The data collected for characterization of the Klockner Property will be reduced and analyzed so as to identify the Klockner Property's physical and biological characteristics; contaminant source characteristics; the nature and extent of contamination; and contaminant fate and transport. Results of the Klockner Property's physical characteristics, source characteristics, and extent of contamination analysis will be used in the analysis of contaminant fate and transport. The evaluation will include the actual and potential magnitude of the releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of the contaminants. The RI data will be presented in a format to facilitate EPA's preparation of the baseline risk assessment. Any data gaps identified by EPA for the completion of the baseline risk assessment will be

addressed. Also, this evaluation will provide any information relevant to the Klockner Property's characteristics necessary for the evaluation of the need for remedial action in the baseline risk assessment and for the development and evaluation of remedial alternatives.

5.3.3 Subtask 3.3 - Data Management Procedures

Data management procedures detailed in the FOP will be followed to document the quality and validity of laboratory and field data compiled during the RI. This subtask will be performed in accordance with the requirements of N.J.A.C. 7:26E.

The information gathered will be consistently documented and recorded in field logs and laboratory reports as detailed in the FOP. Field reports, sample shipment records, analytical results, and QA/QC reports will be maintained to ensure that only validated analytical data are reported and utilized in the evaluation of remedial alternatives. Analytical results developed under the RI/FS Work Plan will be reported in the Characterization Summary Report, accompanied by or cross-referenced to a corresponding QA/QC report. Data security to prevent loss, damage or alteration of project documentation will be detailed in the FOP.

5.3.3.1 Sample Analysis/Validation

The sample analyses to be performed are summarized in Table 3. A summary of analytical methods is provided in Table 4.

5.3.3.2 Laboratory Procurement and Coordination

Envirotech Research, Inc., located in Edison, New Jersey, will be used for all laboratory analyses. Envirotech Research, a certified laboratory in New Jersey (certification No. 12543), is also certified for USEPA-CLP analysis procedures.

A mobile laboratory will be used for field analysis of soil gas samples. The mobile laboratory will be supplied by and operated by Target Environmental Services, Inc. of Columbia, Maryland.

5.3.3.3 Sample Management

All samples collected at the site will be assigned a unique sample identification number, which will indicate the sample type (soil gas, soil, etc.) and location. Sample collection procedures and containers will be in accordance with the approved FOP. Sample handling

and shipping will follow U.S. Department of Transportation (USDOT) or State DOT protocols, whichever are more stringent.

5.3.3.4 Data Validation

Richard Britton of The Whitman Companies, Inc. will act as the Quality Assurance/Quality Control (QA/QC) Officer. He will overview and review field QA/QC, review laboratory QA/QC, and conduct data validation.

5.3.4 Subtask 3.4 - Monthly Progress Reports

Monthly progress reports describing the technical progress at the Klockner Property will be prepared and submitted to EPA by the fifteenth of each month. The progress reports will include the following information where applicable:

- Status of work and progress to date;
- Percentage of work completed and the status of the schedule;
- Difficulties encountered and corrective actions to be taken;
- A summary of results of all sampling, test results or other data received or generated during the performance of the Work;
- The activities planned for the next reporting period; and
- Any changes in key project personnel.

5.3.5 Subtask 3.5 - Characterization Summary Report

Upon completion of the field sampling analysis activities, a preliminary Characterization Summary Report will be prepared and submitted to EPA. This report will review the investigative activities that have taken place, and describe and display data documenting the location and characteristics of surface and subsurface features and contamination at the Klockner Property including the affected medium, location, types, physical state, concentration of contaminants and quantity. The location, dimensions, physical condition and varying concentrations of each contaminant throughout each source and the extent of contaminant migration through each of the affected media will be documented. The Characterization Summary will provide EPA with a preliminary reference for developing the risk assessment, and evaluating the development and screening of remedial alternatives and the refinement and identification of ARARs.

5.4 Task 4 - Identification of Candidate Technologies

Candidate technologies for a treatability studies program will be identified in a technical memorandum, subject to EPA review and approval, during project planning (Task 1). The listing of candidate technologies will cover the range of technologies required for alternative analysis (Task 9). A preliminary evaluation of remedial alternatives is presented in Section 4.2. The specific data requirements for the testing program will be determined and refined during site characterization and the development and screening of remedial alternatives (Task 2 and 8, respectively).

A literature survey will be conducted to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance requirements, and implementability of candidate technologies.

5.5 Task 5 - Treatability Studies

In order to consider Soil Vapor Extraction and other, innovative remedial alternatives, the physical characteristics of subsurface materials at the site must be understood. As described in Section 5.3.1, and more thoroughly in the SAP, select soil samples will be collected and analyzed for organic carbon content and grain size analysis.

The need for treatability studies will be evaluated more thoroughly after the sampling described in Section 5.3 has been completed and evaluated.

If treatability studies are warranted, a Treatability Testing Work Plan, a Treatability Study FOP and a Treatability Study Evaluation Report will be prepared and submitted to EPA. The Treatability Testing Work Plan and Treatability Study FOP may be submitted as addenda to the RI/FS Work Plan.

5.6 Task 6 - EPA's Baseline Risk Assessment

EPA will perform the baseline risk assessment for the Klockner Property, utilizing information provided by Klockner in the Summary Report and Characterization Summary Report. The major components of the baseline risk assessment include contaminant identification, exposure assessment, toxicity assessment, and human health and ecological risk characterization. EPA shall provide Klockner with the opportunity to comment on interim risk assessment deliverables and the final baseline risk assessment report as required by CERCLA, the NCP, and all applicable EPA guidance documents. ARARs (NJDEP's February 1994 Soil Cleanup Criteria) exist in New Jersey with respect to the primary

contaminants of concern already identified at the Klockner Property. This should alleviate the need for a quantitative risk assessment.

5.7 Task 7 - Remedial Investigation Report

A draft RI Report, summarizing the results of field activities to characterize the Klockner Property, sources of contamination, nature and extent of contamination and fate and transport of contaminants, will be prepared at the completion of the field investigation and evaluation of data. This report will present a discussion of field procedures used and analytical results found on a task by task basis. The report will also present analytical findings and a summary of conclusions, specifically those from Task 3.1 (Field Investigation), Task 3.2 (Data Analyses), Task 3.3 (Data Management), and Task 6 (Risk Assessment). The proposed Table of Contents of the report is presented in Table 5. This task will be complete upon submittal of a final RI Report incorporating review and comments on the draft report by the EPA.

The Executive Summary to the Draft RI Report will provide a brief overview of the field investigative tasks and the types of data collected. This section will focus on the interpretation of data, present the findings of the investigation, and discuss the extent that these findings meet the RI objectives.

Section 1.0, Introduction, will address four major areas: site background information, the nature and extent of contamination, the objectives of each field investigation task, and an overview of the report's contents.

Section 2.0, Study Area Investigation, will present an overview of the field activities associated with the characterization of the site.

Section 3.0, Physical Characteristics of the Study Area, will include data on demography, land use, natural resources and their use, climatology, topography, and hydrology.

Section 4.0, Nature and Extent of Contamination, will provide a detailed description of sampling procedures, sampling conditions, equipment decontamination procedures, and sample handling.

Section 5.0, Contaminant Fate and Transport, will present conceptual site models showing contaminant migration pathways.

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Section 6.0, Risk Assessment, will be prepared based on the results of the EPA's Risk Assessment. A summary of the results of EPA's Risk Assessment will be presented.

Section 7.0, Summary and Conclusions, will present the findings of this investigation.

5.8 Task 8 - Development of Remedial Action Objectives and Screening of Remedial Alternatives

Based on the RI data, remedial action objectives that EPA has identified for each actually or potentially contaminated medium will be reviewed and, if necessary, refined more fully. Prior to refining these objectives, significant site problems and contaminant pathways will have been identified. Considering these problems and pathways, the remedial action objectives which should eliminate or minimize risks to public health and the environment will be developed further, including a refinement of the ARARs which emphasize site-specific conditions.

This task will be conducted after existing information has been analyzed and an understanding of potential risks has been determined by EPA (Task 6). If determined necessary by EPA based on the above information, general response actions will be developed for each medium of interest defining containment, treatment, excavation, or other actions, singly or in combination, to satisfy the remedial action objectives.

A presentation will be made to EPA which will identify the remedial action objectives, summarize the technology types and process options, and summarize the results and reasoning employed in screening. The presentation will array alternatives that remain after screening, and identify the action-specific ARARs for those alternatives. Any EPA comments will be addressed in the document.

5.8.1 Subtask 8.1 - Development and Screening of Remedial Alternatives

The objective of this task is to develop a range of waste management options that will be evaluated. The development and screening of remedial alternatives will be in conformance with the requirements of CERCLA and NCP. The detailed analysis of the alternatives will be in accordance with all EPA guidance documents which are determined by EPA to be appropriate. Guidance documents may include those related to EPA's Superfund Accelerated Cleanup Model and presumptive remedies.

The range of alternatives evaluated will include as appropriate:

- options in which treatment is used to reduce the toxicity, mobility, or volume of wastes, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed;
- options involving containment with little or no treatment;
- options involving both treatment and containment; and
- a no action alternative.

A range of waste management options that, at a minimum, ensure protection of human health and the environment will begin to be developed and evaluated concurrently with the RI characterization task. A brief description of possibly applicable remedial technologies is provided in Table 1 and discussed in Section 4.2.

This task will involve the development and screening of remedial alternatives through conduct of the following activities:

- identifying areas or volumes of media to which general response actions may apply;
- identifying, screening and documenting applicable remedial technologies;
- assembling and documenting alternatives;
- refining alternatives; and
- conducting and documenting a screening evaluation of each alternative.

5.8.1.1 Identifying Areas or Volumes of Media to Which General Response Actions May Apply

Areas or volumes of media (excluding groundwater) to which general response actions may apply will be identified. Requirements for protectiveness, as identified in the remedial action objectives and the chemical and physical characterization of the Klockner Property, will be taken into account.

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5.8.1.2 Identifying, Screening and Documenting Applicable Remedial Technologies

Technologies applicable to each general response action will be identified and evaluated to eliminate those which cannot be implemented at the Klockner Property. General response actions will be refined to identify remedial technology types. Technology process options for each of the technology types will be identified either concurrent with the identification of technology types, or following the screening of the considered technology types. The process options will be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain one or more representative processes for each technology type.

5.8.1.3 Assembling and Documenting Alternatives

Selected representative technologies will be assembled into alternatives for each medium. Together, all of the alternatives will represent a range of treatment and containment combinations that will address contamination at the Klockner Property.

5.8.1.4 Refining Alternatives

The remedial alternatives will be refined to identify contaminant volume addressed by the proposed process and sizing of critical unit operations as necessary. Sufficient information will be collected for a comparison of alternatives. Remediation goals for each chemical in each medium will also be modified as necessary to incorporate any new risk assessment information presented in EPA's baseline risk assessment report. Action specific ARARs will be updated as the remedial alternatives are refined.

5.8.1.5 Conducting and Documenting a Screening Evaluation of Each Alternative

A final screening process may be performed based on short-term and long-term aspects of effectiveness, implementability, and relative cost. This screening process may be necessary if there are many feasible alternatives available for detailed analysis. If necessary, the screening of alternatives will be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis. it should be noted that presumptive remedies are available for VOC contaminated soil and may limit the need for screening of additional alternatives. As appropriate, the screening will preserve the range of treatment and containment alternatives that was initially developed. The range of remaining alternatives will include options that use treatment technologies and permanent solutions to the maximum extent practicable.

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5.9 Task 9 - Feasibility Study Report

The detailed analysis of remedial alternatives will be conducted to provide EPA with information needed to allow for the selection of a remedy. The results of this analysis will be presented in the Feasibility Study Report.

5.9.1 Subtask 9.1 - Detailed Analysis of Alternatives

The remedial alternatives which pass the initial screening process will be subject to a detailed evaluation in conformance with the requirements of CERCLA and NCP. The detailed analysis of the alternatives will be in accordance with all EPA guidance documents which are determined by EPA to be appropriate. Guidance documents may include those related to EPA's Superfund Accelerated Cleanup Model and presumptive remedies.

This evaluation will be based on the following nine (9) criteria:

1. Overall Protection of Human Health and the Environment

   The general goal of a selected remedial action, as specified in SARA Section 121(b), is to protect human health and the environment. The overall evaluation of each criteria must assure that this goal is met.

2. Compliance with ARARs

   As required by SARA (Section 121[d]), remedial alternatives must be evaluated as to their ability to meet all Federal and State ARARs which may be specific for individual contaminants, the location of the site, or for a particular remedial technology. ARARs may include, where appropriate, a deed restriction with applicable engineering and/or institutional controls. Preference will be given to remedial alternatives which attain ARARs. However, waivers can be considered as provided in SARA Section 121(d) (4).

3. Long-Term Effectiveness and Permanence

   The evaluation will consider the degree to which remedial alternatives achieve a permanent reduction of health and environmental risks. The long-term effectiveness and permanence criteria weigh the advantages and disadvantages of remedial alternatives which involve years of treatment before the contamination is

reduced to safe, acceptable levels identified through the risk assessment and ARARs.

4. Reduction of Toxicity, Mobility, and Volume of Contamination

The effectiveness of remedial alternatives in reducing the risks to human health and the environment by reducing the toxicity, mobility, and volume of contamination will be evaluated. Alternatives which apply treatment technologies and result in a minimum of residual contamination are more preferable.

5. Short-Term Effectiveness

The advantages and disadvantages of remedial alternatives that are effective in reducing the toxicity, mobility, and volume of contamination, but which may pose short-term health risks, will be considered.

6. Implementability

The criterion of implementability will consider a remedial alternative's availability, technical feasibility, feasibility of construction, operational reliability, and the level of effort required to meet institutional and administrative approval and permit requirements.

7. Cost

The evaluation of the cost of each remedial alternative will include capital costs, operation and maintenance costs, and equipment replacement costs. If a remedial alternative results in contamination remaining on site, a review of the continued effectiveness of the action must take place every 5 years. The cost of these reviews will be included in the evaluation.

8. State Acceptance

It is expected that the State will have a substantial and meaningful involvement throughout the duration of the RI/FS. The evaluation process will consider New Jersey's preferences for remedial action. The remedial technologies that the State strongly opposes, has some reservations about, or supports will be evaluated accordingly.

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9. Community Acceptance

The evaluation of remedial alternatives will consider the concerns of the residents as to their continued health and safety, the availability of information, the extent of contamination, and the schedule for cleanup. The selected remedial alternatives will be presented to the community in order to solicit their comments.

The review of each alternative will provide:

- a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with the alternative.

- a discussion of the individual criterion assessment.

A comparative analysis between the remedial alternatives will be performed.

5.9.2 Subtask 9.2 - Feasibility Study Report

The preparation of the Feasibility Study Report will consist of the following subtasks:

- summarizing each alternative in terms of detailed technology, reliability, implementability, public health, environment, institutional requirements, and cost evaluation

- comparing and contrasting each of the remedial alternatives

- preparing the draft and final FS report

The FS report will consist of four sections as shown on Table 6.

- The Executive Summary will provide a brief overview of the FS process, the analyses used in the evaluations, and the remedial alternatives evaluated.

- Section 1.0, Introduction, will address background information as summarized from the RI Report.

- Section 2.0, Identification and Screening of Technologies, will discuss the remedial action objectives.

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- Section 3.0, Development and Screening of Alternatives, will focus on the development of remedial alternatives.

- Section 4.0, Detailed Analysis of Alternatives, will describe the alternatives, provide an assessment of each alternative and include a comparison of alternatives.

The report will be produced in draft and final forms.

6.0 PROJECT ORGANIZATION, RESPONSIBILITY AND SCHEDULE

6.1 Project Organization and Responsibility

The Whitman Companies, Inc. maintains overall technical responsibility for conducting the RI/FS for the Klockner Property. As such, The Whitman Companies, Inc. will perform the field investigations, tabulate and assess the data, provide QA/QC oversight, and prepare the appropriate reports under the RI/FS.

The direct management of the technical and administrative aspects of the project will be accomplished by representatives of The Whitman Companies, Inc. and the law firm of Riker, Danzig, Scherer, Hyland & Perretti.

Details concerning project organization and responsibility are provided in the QAPP submitted in conjunction with this RI/FS Work Plan and the October 1995 SMP.

6.2 Schedule of RI/FS Activities

The estimated schedule to complete the tasks outlined in the RI/FS is detailed in Table 7. This schedule may change or be amended as site and analytical data become available. EPA will be notified of any changes in the schedule.

7.0 REFERENCES

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TABLES

TABLES

TABLE 1

KLOCKNER PROPERTY
REMEDIAL ALTERNATIVES CONSIDERED
FOR THE SOURCE AREA(S)

ALTERNATIVE	MAIN FEATURES & ADVANTAGES	LIMITATIONS
1. No further action	No additional cost	May not be acceptable to the regulatory agency if not protective of human health and environment.
2. Partial Excavation of Soils in the Source Area	Excavation of contaminant soils outside the building offers a permanent, albeit partial, mitigation	The presence of utility mains and the building foundation may create problems. Dewatering required for contaminated soil below the water table may increase the cost. Off-site disposal may be costly, on-site treatment may not be feasible due to the site location (mixed residential/industrial) and available open space for on-site treatment
3. Complete Excavation	Excavation expanded under the building	Infeasible due to requirements for a demolishing of the building. Very expensive off-site disposal. No assurance that all contaminated soil will be successfully removed.
4. Capping	Capping prevents infiltration through the source area	Does not eliminate lateral flow of ground water through the area extending from the seasonally low water table to the seasonally high water table. Only partial mitigation is achieved at a low cost.
5. Full Encapsulation	A slurry wall or sheet piling plus capping create a passive barrier.	The presence of the building and utility mains make this option infeasible.
6. Soil Vapor Extraction (SVE)	A vacuum applied to extraction well(s) volatilizes VOC. A proven technology for permeable soil and a presumptive remedy for VOC contaminated soil.	Feasible for the vadose zone. Special measures required for its use under the building. Would require dewatering to be applied below the water table. Moderate soil permeability would limit the effectiveness of SVE.

TABLE 1 (Continued)

KLOCKNER PROPERTY
REMEDIAL ALTERNATIVES CONSIDERED
FOR THE SOURCE AREA(S)

ALTERNATIVE	MAIN FEATURES & ADVANTAGES	LIMITATIONS
7. Air Sparging with SVE	Air sparging used for treatment of the water saturated zone, SVE for the vadose zone and to capture vapors generated by sparging.	Limited applicability and effectiveness. Low to moderately permeable soil and the potential presence of product droplets in the saturated zone. A complete cleanup generally not possible. Risk of spreading contamination outward and upward. Sparging is still an experimental technology.
8. Thermal Methods (Steam and Hot Water Injection)	Higher temperature enhances volatilization of chlorinated hydrocarbons. May be used in conjunction with other methods.	The control of the sweep of the treatment fluids through the treated zone difficult under site-specific conditions. Special equipment set-up required. Only very low quality steam could be injected at shallow depth. Experimental technology.
9. Surfactant Flooding/Flushing	Surfactant solution is flushed through the subsurface to enhance the solubility of the contaminants.	The same limitations as above. Problems with surfactant selections and treatment/recovery. Expensive. Experimental technology.

TABLE 2

KLOCKNER PROPERTY
PRELIMINARY LISTING OF POTENTIAL
FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ACTION-SPECIFIC	RATIONALE
Hazardous Waste Requirements (RCRA Subtitle C, 40 CFR, Part 264)	Standards applicable to treating, storing and disposing of hazardous waste
Safe Drinking Water Act	
- Underground Injection Control Regulations (40 CFR, Parts 144, 145, 146, and 147)	May be applicable to on-site ground water recirculation systems
Clean Water Act	
- NPDES permit	Contamination pattern or remedial alternative may include discharge to surface waters
Clean Air Act	
- Public health basis to list pollutants as hazardous under Section 112 of the Clean Air Act	Remedial alternatives may include volatilization technologies
OSHA Requirements (29 CFR, Parts 1910, 1926, and 1904)	Required for workers engaged in on site remedial activities
DOT Rules for Hazardous Materials Transport (49 CFR, Parts 107, 171.1-171.500)	Remedial alternatives may include off-site treatment and disposal
EPA's Ground Water Protection Strategy	Remedial alternatives must consider EPA classification of ground water conditions at the site
New Jersey's Technical Requirements for Site Remediation (N.J.A.C. 7:26E)	Regulations constituting the minimum technical requirements to investigate and remediate contaminated sites
Closure and Post-Closure Requirements (N.J.A.C. 7:26-9)	Apply to long-term monitoring of site conditions.
Air Pollution Control (N.J.A.C. 7:27)	Must be evaluated as soil vapor extraction is a potential remedial alternative.

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TABLE 2 (Continued)

KLOCKNER PROPERTY
PRELIMINARY LISTING OF POTENTIAL
FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ACTION-SPECIFIC (Continued)	RATIONALE
NJPDES (N.J.A.C. 7:14A) and Surface Water Quality	Apply to discharge of treated water.
Soil Erosion and Sediment Control Plan (N.J.A.C. 13:27)	Apply to remedial alternatives including disturbance of more than 5,000 square feet of surfae area.
New Jersey's Industrial Site Recovery Act Regulations (N.J.A.C. 7:26B)	Requirements concerning remediation of industrial establishments, allows use of engineering and/or institutional controls.

TABLE 2 (continued)

KLOCKNER PROPERTY
PRELIMINARY LISTING OF POTENTIAL
FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CONTAMINANT-SPECIFIC	RATIONALE
Safe Drinking Water Act	Remedial actions may provide clean up to the Maximum Contaminant Levels (MCLs) Maximum Contaminant Level Goals (MCLGs) are promulgated Federal criteria and include VOCs
Health Advisories, EPA Office of Drinking Water	RI activities identified presence of chemicals for which health advisories are listed
Clean Water Act (PL92-500); Federal Water Quality Criteria (FWQC)	Contamination pattern or remedial alternative may include discharge to surface waters
Clean Air Act (42 USC 7401); National Ambient Air Quality Standards (NAAQS) for six criteria pollutants (40 CFR Part 50)	Remedial alternatives may include volatilization technologies
Water Quality Regulations Title 6, Chapter X, Parts 700-705	Provides surface water and groundwater classifications and standards
Ground Water Classifications, Quality Standards and Effluent Standards and/or Limitations (N.J.A.C. 7:9-6)	Remedial action may require cleanup to state standards if they are more stringent than federal
- Classes and quality standards for ground water	State of New Jersey requires protection of ground water for use as potable water and cleanup to these standards.
- Effluent standards and/or limitations for discharge to ground water	Remedial alternatives may impact ground water on site.
NJDEP Soil Cleanup Objectives	Remedial alternatives may address soil treatment.
Surface Water Standards and Criteria	Remedial alternatives may impact surface water.

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TABLE 2 (continued)

THE KLOCKNER PROPERTY
PRELIMINARY LISTING OF POTENTIAL
FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

LOCATION-SPECIFIC	RATIONALE
Rivers and Harbors Act of 1899 33 CFR Parts 320-327	Remedial alternatives at site may affect the Rockaway River
Roe Amendment, Water Quality Act of 1987, Section 318, CFR, January 24, 1989 pages 2946-2948, and Superfund Amendments and Reauthorization Act of 1986 (Section 118 (c))	The site lies within the Unconsolidated Quaternary Sole Source Aquifer. These regulations prevent locating surface water impoundments, waste piles, or land treatment facilities over such an aquifer or zone.
Executive Orders 11988 (Floodplain Management) and 11990 (Protection of wetlands)	Both floodplain and wetland resources may be affected by the site remedial alternatives.
Endangered Species Act of 1978 (16 USC 1531)	Considered in the public health and environmental assessment.
Fish & Wildlife Coordination Act (16 USC 661)	Remedial alternatives may affect wetlands and protected habitats.
Fish & Wildlife Improvement Act of 1978 (16 USC 742)	Remedial alternatives may affect wetlands and protected habitats.
Fish & Wildlife Conservation Act of 1980 (14 USC 2901)	Remedial alternatives may affect wetlands and protected habitats.
National Historic Preservation Act (NHPA)	The project area may be sensitive for the discovery of cultural resources.
Classifications and Standards of Quality and Purity (N.J.A.C. 7:9-4)	Remedial action may require cleanup to state standards if they are more stringent than Federal.
- Classes and Standards for Surface Waters	These standards are applicable to classes of water near the site.

300325

TABLE 3A

KLOCKNER PROPERTY
SUMMARY OF PROPOSED SOIL GAS SAMPLES

Area	Soil Gas Sample Designation	Analytical Parameters
Alleyway Area		
Building 12	SGA-04A	PHAL
	SGA-13	PHAL
	SGA-14	PHAL
	SGA-14A	PHAL
	SGA-15	PHAL
	SGA-21	PHAL
	SGA-22	PHAL
	SGA-23	PHAL
	SGA-24	PHAL
	SGA-25	PHAL
	SGA-3A1	PHAL
	SGA-3A2	PHAL
	SGA-33	PHAL
	SGA-34	PHAL
	SGA-35	PHAL
	SGA-36	PHAL
	SGA-43	PHAL
	SGA-44	PHAL
	SGA-45	PHAL
	SGA-4A6	PHAL
	SGA-51	PHAL
	SGA-52	PHAL
	SGA-53	PHAL
	SGA-54	PHAL
	SGA-55	PHAL
	SGA-63	PHAL
	SGA-64	PHAL
	SGA-65	PHAL

TABLE 3A (Continued)

KLOCKNER PROPERTY
SUMMARY OF PROPOSED SOIL GAS SAMPLES

Area	Soil Gas Sample Designation	Analytical Parameters
North Drum Storage Area - Building 12	SGN-11	VOC
	SGN-12	VOC
	SGN-13	VOC
	SGN-20	VOC
	SGN-21	VOC
	SGN-22	VOC
	SGN-23	VOC
	SGN-31	VOC
	SGN-32	VOC
	SGN-33	VOC
	SGN-42	VOC
	SGN-43	VOC
Soil Gas Survey - Building 13	SG-00A	PHAL
	SG-01A	PHAL
	SG-10	PHAL
	SG-11	PHAL
	SG-12	PHAL
	SG-12A	PHAL
	SG-13	PHAL
	SG-14	PHAL
	SG-15	PHAL
	SG-20	PHAL
	SG-20A	PHAL
	SG-21	PHAL
	SG-22A	PHAL
	SG-23	PHAL
	SG-24	PHAL
	SG-25	PHAL
	SG-30	PHAL
	SG-31	PHAL
	SG-32A	PHAL
	SG-32B	PHAL
	SG-33	PHAL
	SG-34	PHAL

TABLE 3A (Continued)

KLOCKNER PROPERTY
SUMMARY OF PROPOSED SOIL GAS SAMPLES

Area	Soil Gas Sample Designation	Analytical Parameters
	SG-35	PHAL
	SG-40	PHAL
	SG-41	PHAL
	SG-42	PHAL
	SG-42A	PHAL
	SG-42B	PHAL
	SG-43	PHAL
	SG-44	PHAL
	SG-45	PHAL
	SG-46	PHAL
	SG-50	PHAL
	SG-50A	PHAL
	SG-51	PHAL
	SG-52	PHAL

PHAL - Purgeable halocarbons by EPA Method SW-846 8010
VOC - Volatile organic compounds by EPA Methods SW-846 8010 and SW846 8020

NOTE 1: Sample locations identified by grid row and column numbers
NOTE 2: Samples will be analyzed in mobile laboratory
NOTE 3: Building 12 samples will be collected from depth of 3 feet and Building 13 at 4 feet
NOTE 4: Additional soil gas samples will be collected at the Building 13 Property from two depths in any potential source areas identified by the first phase of soil gas samples

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TABLE 3B

KLOCKNER PROPERTY
SUMMARY OF PROPOSED SOIL SAMPLING

AEC	Sample Designation	Sample Depth	Analytical Parameters
Building 12			
Underground Gasoline Tank	SSGT-1	0-6" Below Tank Backfill	VOC
	SSGT-2	0-6" Below Tank Backfill	VOC
Waste Oil Tank	SSWT-1	7-7.5'	PHAL
	SSWT-2	7-7.5'	PHAL
Catch Basin/Storm Sewer	SSCB-1	2-2.5'	BN, TAL
Leaching Pit	SSLP-1	12-12.5'	TAL
Degreaser Pit	SSDP-1	3-3.5'	PHAL
Alleyway[1]	SSAW-1[2]	-	PHAL
	SSAW-2[2]	-	PHAL
	SSAW-3[2]	-	PHAL
	SSAW-4[2]	-	PHAL
	SSAW-5[2]	-	PHAL
	SSAW-6[2]	-	PHAL
	SSAW-7[2]	-	PHAL
Scale Room	SSSR-1	Field Determined	PHAL
	SSSR-2	0-6" below floor	PHAL
	SSSR-3	0-6" below floor	PHAL
Drum Storage Shed	SSFS-1A	0-6" below pavement	PHC, BN*, TAL
	SSFS-1B	Field Determined	VOC
Drum Storage in Alleyway	SSDSA-1	0-6" below pavement	TAL, CN
North Drum Storage Area	SSNDS-1A	0-6" below pavement	PHC, BN*, TAL
	SSNDS-1B	Field Determined	VOC
	SSNDS-2A	0-6" below pavement	PHC, BN*, TAL
	SSNDS-2B	Field Determined	VOC
Sump	SSSP-1	1-1.5' below sump invert	PHC, VOC, BN*, TAL

300329

TABLE 3B (Continued)

KLOCKNER PROPERTY
SUMMARY OF PROPOSED SOIL SAMPLING

AEC	Sample Designation	Sample Depth	Analytical Parameters
Building 12			
Geologic Characterization	SSGC-1	Field Determined	GS, TOC
	SSGC-2	Field Determined	GS, TOC
	SSGC-3	Field Determined	GS, TOC
	SSGC-4	Field Determined	GS, TOC
Building 13			
Geological Characterization	SSGC-?	Field Determined	GS, TOC

KEY

PHC - Petroleum Hydrocarbons by EPA Method 418.1 modified for soil
VOC - Target compound list Volatile Organic Compounds +10 by EPA Method SW-846 8240
BN - Target compound list Base/Neutral Extractable Organic Compounds + 15 by EPA Method SW-846 8270
TAL - Total analyte list metals by EPA Methods SW-846 6010 and SW-846 7000
CN - Cyanide by CLP SOW Methodology for Inorganic Analysis
PHAL - Purgeable Halocarbons by EPA Method SW-846 8010
GS - Grain size by ASTM D-422
TOC - Total Organic Carbon by USEPA Region II Lloyd Kahn Method
* - Contingent on PHC results
1 - This area includes the Quonset Hut and area between the Alleyway and Degreaser Pit
2 - The actual number of boring locations and samples collected from each boring location will be based on the results of the proposed soil gas survey.
- - Sample depths will be field determined, see [2]
? - Number of samples to be determined by results of soil gas survey

300330

TABLE 4

KLOCKNER PROPERTY
SUMMARY OF PRESERVATION METHODS, SAMPLE CONTAINERS, HOLDING TIMES AND ANALYTICAL METHODS

300331

Parameter	Sample Container	Sample Volume	Preservation	Maximum Holding Time*	Analytical Methodology
A. Soil Sample Analysis					
GC Purgeable Halocarbons	4 oz. volatile organic analysis glass container	5g	4 °C	14 days	SW-846, 3rd edition, vol. 1-B; GC-8010
TCL Volatile Organic Compounds +10 with Xylenes	4 oz. volatile organic analysis glass container	5g	4 °C	14 days	SW-846, 3rd edition, vol. 1-B; GC/MS-8240
TCL Base/Neutral Extractable Organics +10	8 oz. glass container	30g	4 °C	Extraction: 14 days Analysis: 40 days from extraction	SW-846, 3rd edition, vol. 1-B; GC/MS-8270
TAL Metals (except Mercury)	8 oz. glass container	5g	4 °C	6 months	SW-846, 3rd edition, vol. 1-A; 6010 & 7000
Mercury	8 oz. glass container	1g	4 °C	38 days	SW-846, 3rd edition, vol. 1-A; 6010 & 7000
PCB's	8 oz. glass container	30g	4 °C	Extraction: 14 days Analysis: 40 days from extraction	SW 846, 3rd edition, vol. 1-B; GC-8080
Total Cyanide	8 oz. glass container	30g	4 °C	14 days	CLP SOW Methodology, for Inorganic Analysis Multi-Media, Multi-Concentration, Document ILM03.0
Petroleum Hydrocarbons	8 oz. glass container	30g	4 °C	Extraction: 28 days Analysis: 40 days from extraction	EPA Method 418.1 modified for soil
Grain Size	-	-	-	-	ASTM D-422
Total Organic Carbon	8 oz. glass container	25g	4 °C	28 days	USEPA Region 2 Lloyd Kahn Method for determination of Total Organic Carbon in Sediment, July 1988
B. Soil Gas Analysis					
GC Volatile Organics	Pre-evacuated 30 ml glass vial	30 ml @ 2 atm	-	5 days	SW-846 3rd edition, vol. 1-B; modified 8010 & 8020

* Holding time begins at time of sample collection

Note: Sample containers will be provided by laboratories and will be pre-cleaned and certified in accordance with EPA protocol.

TABLE 5

KLOCKNER PROPERTY
REMEDIAL INVESTIGATION REPORT
TABLE OF CONTENTS

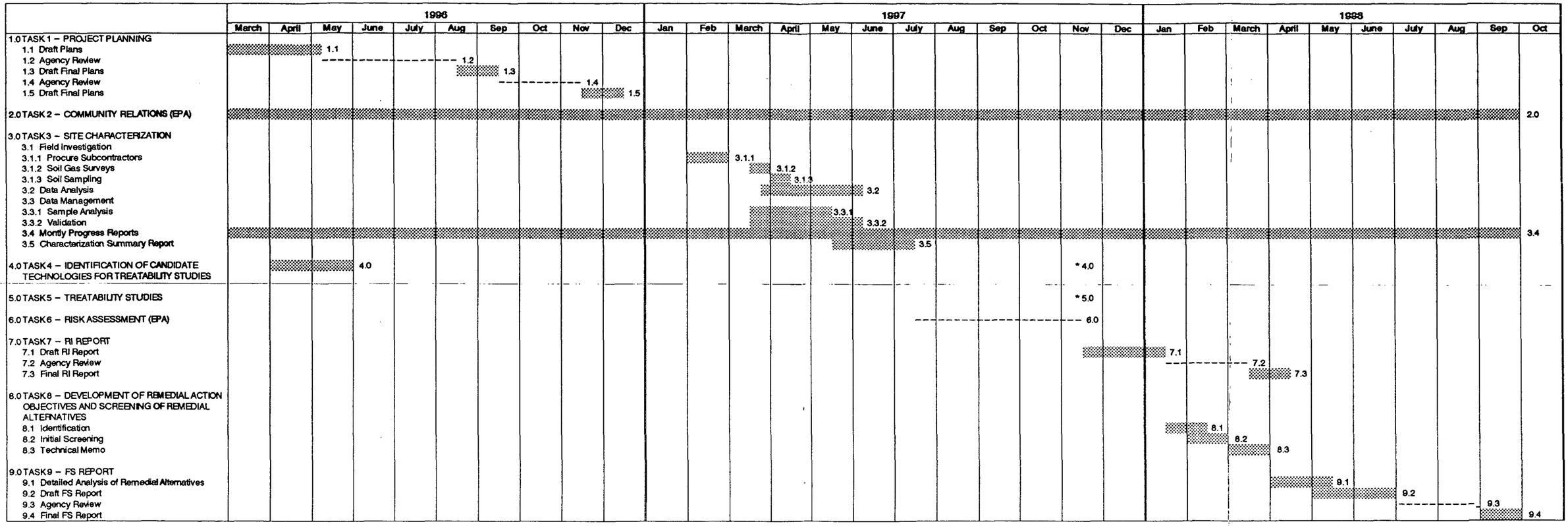
TABLE 6

KLOCKNER PROPERTY
FEASIBILITY STUDY REPORT
TABLE OF CONTENTS

300333

TABLE 7

KLOCKNER PROPERTY
PROJECTED RI/FS SCHEDULE



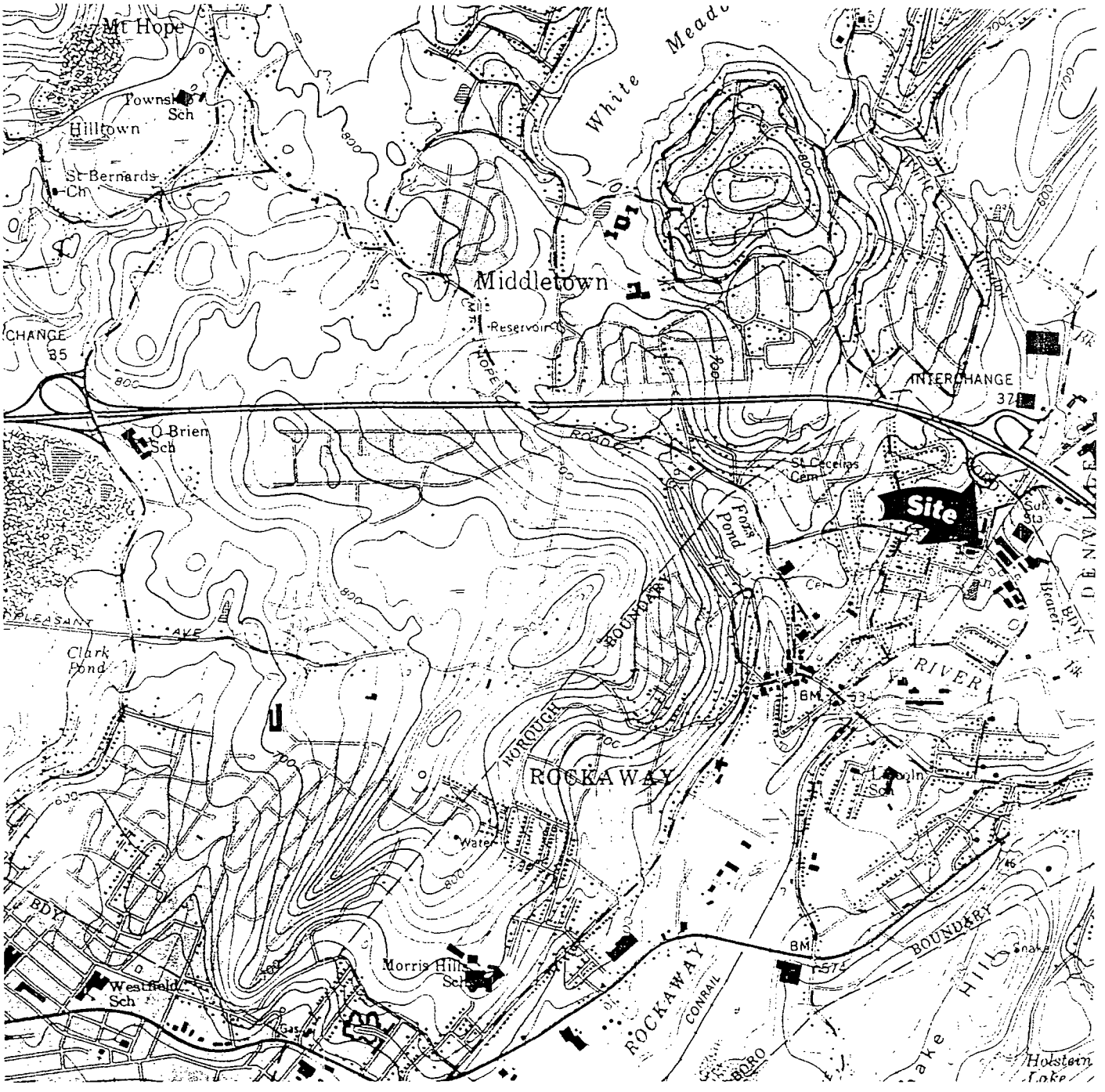
-- Projected period for agency review of documents and preparation of Risk Assessment
* If task is necessary, schedule will be revised
NOTE: Schedule assumes EPA issues approval of RI/FS Work Plan during January 1997

F:\USERS\LOTUS\950302-1

300334

FIGURES

FIGURES



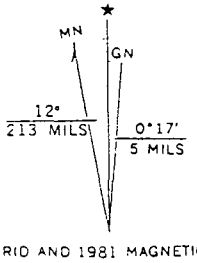
SCALE 1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

300337



UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

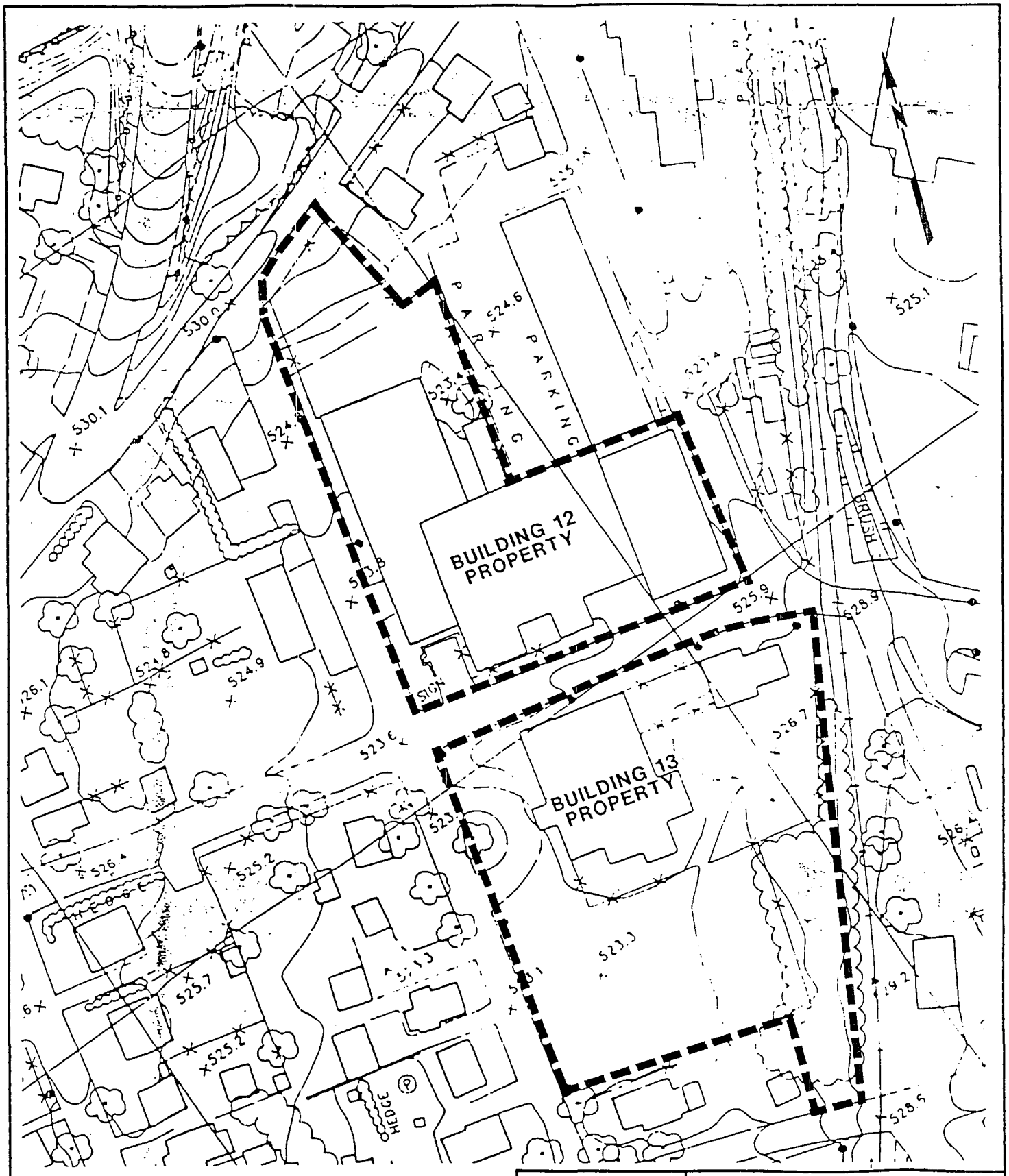
QUADRANGLE LOCATION

THE WHITMAN Companies, INC.

KLOCKNER & KLOCKNER PROPERTY
ROCKAWAY BOROUGH
MORRIS COUNTY, NJ

SITE LOCATION ON USGS
DOVER QUADRANGLE

ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#:	DATE: MAY 1996	FIGURE: 1.1

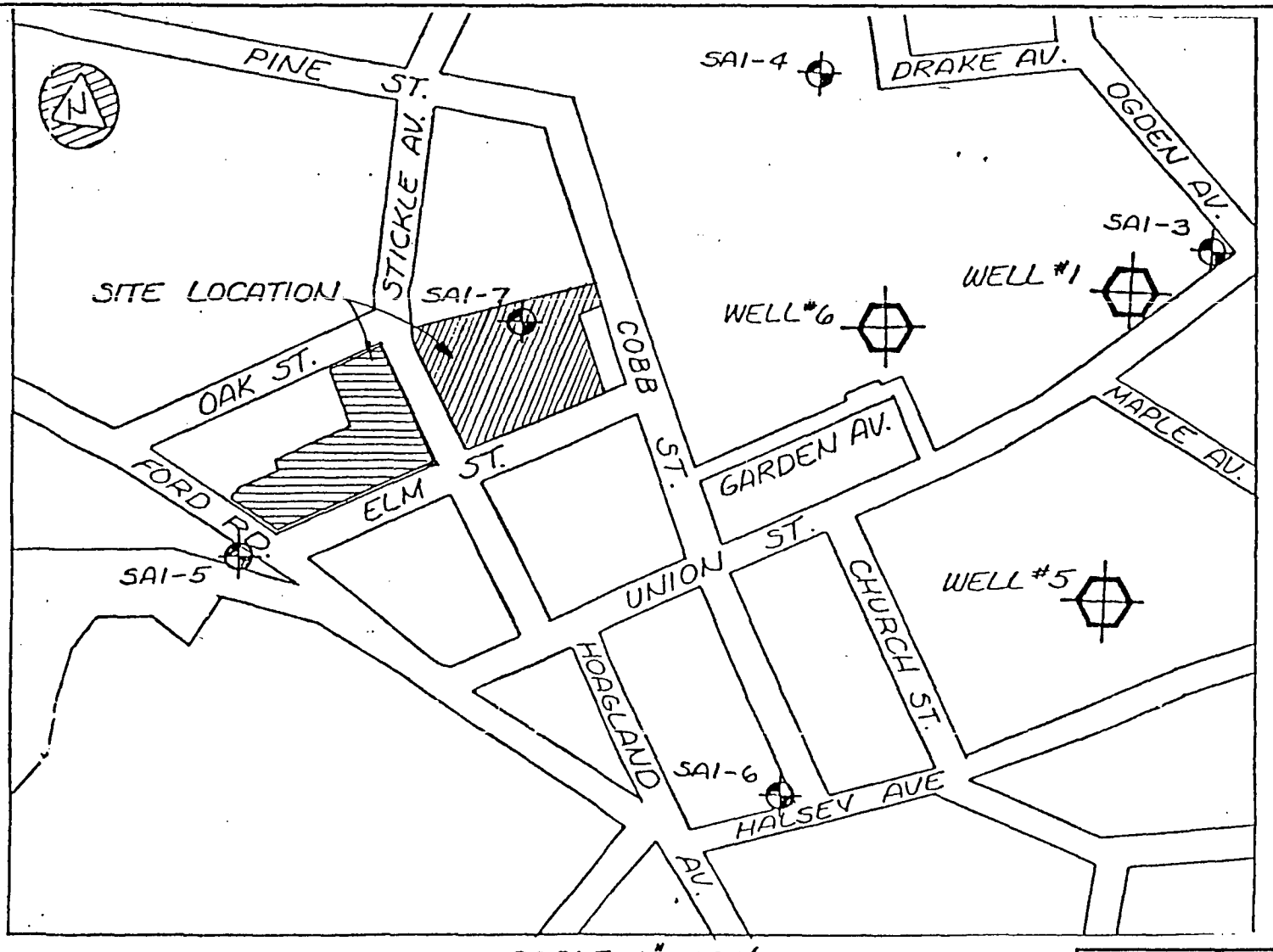


SOURCE:

AERIAL SURVEY DATED JUNE 1994 PREPARED BY ROBINSON AERIAL SURVEY'S INC. FOR CONESTOGA-ROVERS & ASSOCIATES

300338

THE WHITMAN CompanieS, INC.	KLOCKNER & KLOCKNER PROPERTY ROCKAWAY BOROUGH MORRIS COUNTY, NJ	
	SITE MAP OF KLOCKNER PROPERTY	
ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#:	DATE: MAY 1996	FIGURE: 1.2



300339

SCALE: 1" = 300'

LEGEND

NJDEP MONITORING WELL

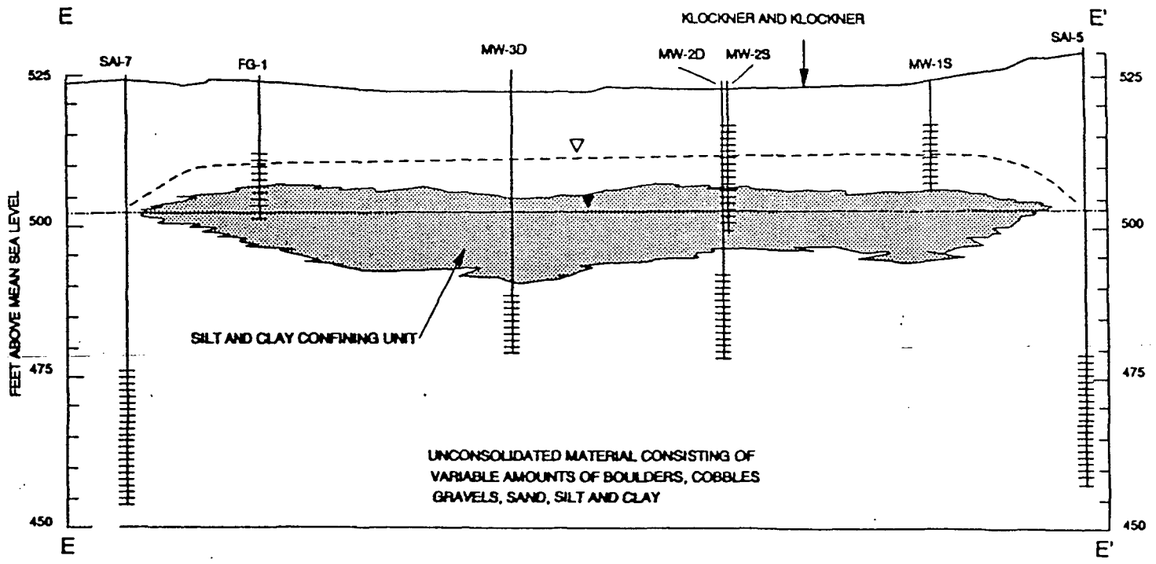
SOURCE: FIRST ENVIRONMENT

THE WHITMAN Companies, INC.

KLOCKNER & KLOCKNER PROPERTY
ROCKAWAY BOROUGH
MORRIS COUNTY, NJ

ROCKAWAY BOROUGH WELL
LOCATION MAP

ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG. #:	DATE: MAY 1996	FIGURE: 1.3



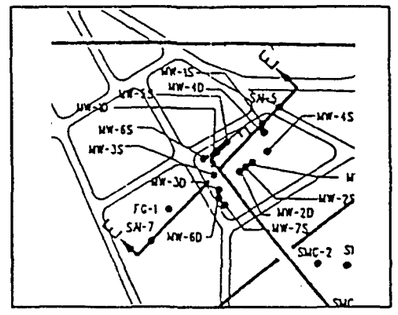
LEGEND

APPROXIMATE HORIZONTAL SCALE
1 INCH = 100 FEET

PERCHED WATER TABLE

INFERRED GROUNDWATER TABLE

MONITORING WELL AND SCREENED INTERVAL

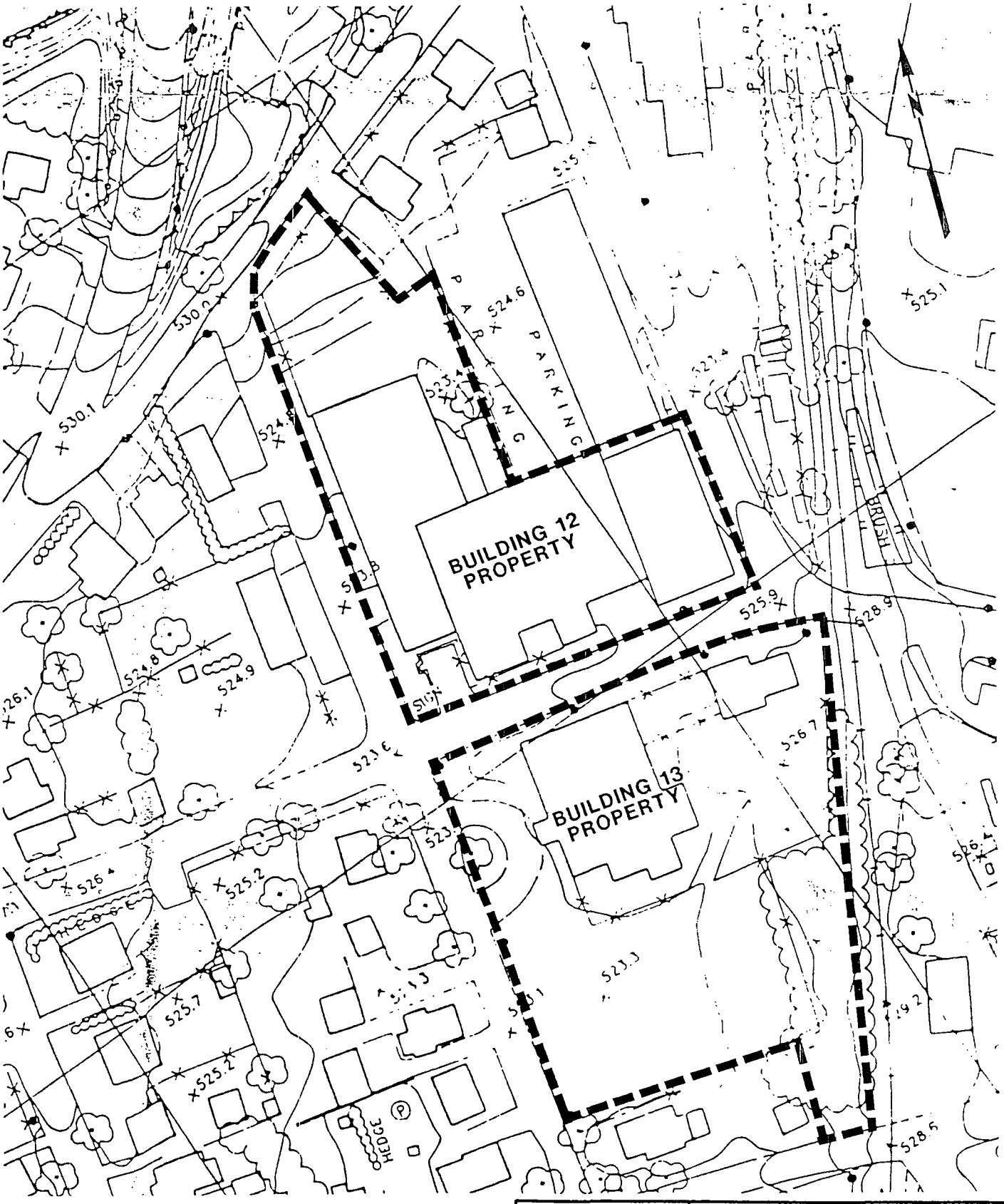


CROSS--SECTION LOCATION
NOT TO SCALE

SOURCE: ICM, 1991

300340

THE WHITMAN Companies, INC.	KLOCKNER & KLOCKNER PROPERTY ROCKAWAY BOROUGH MORRIS COUNTY, NJ	
	GEOLOGIC AND HYDROGEOLOGIC CROSS SECTION	
ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#:	DATE: MAY 1996	FIGURE: 2.1

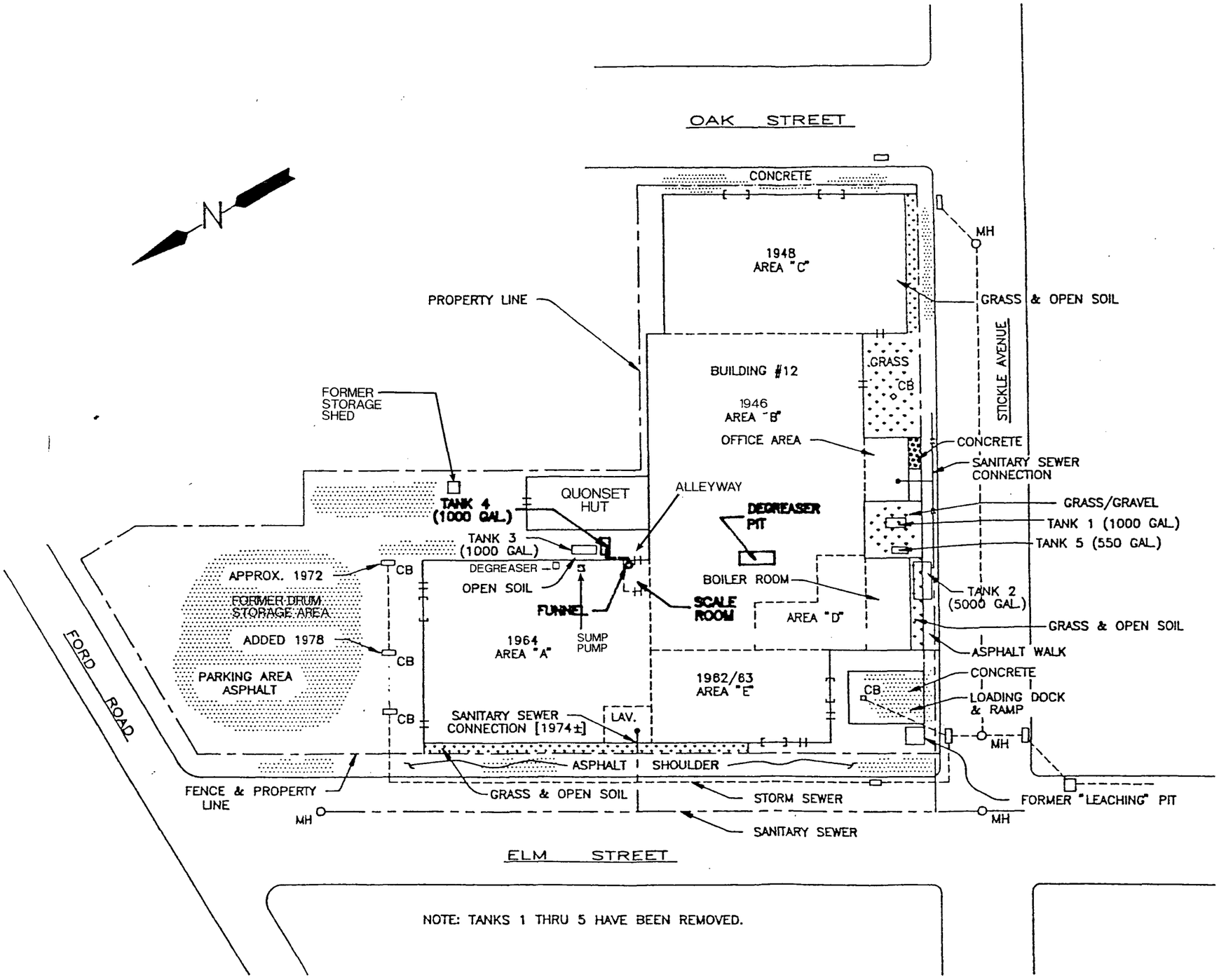


SOURCE:

AERIAL SURVEY DATED JUNE 1994 PREPARED BY ROBINSON AERIAL SURVEY'S INC. FOR CONESTOGA-ROVERS & ASSOCIATES

300341

THE WHITMAN Companies, INC.	KLOCKNER & KLOCKNER PROPERTY ROCKAWAY BOROUGH MORRIS COUNTY, NJ	
	TOPOGRAPHY OF KLOCKNER & KLOCKNER PROPERTY	
ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#:	DATE: MAY 1996	FIGURE: 2.2



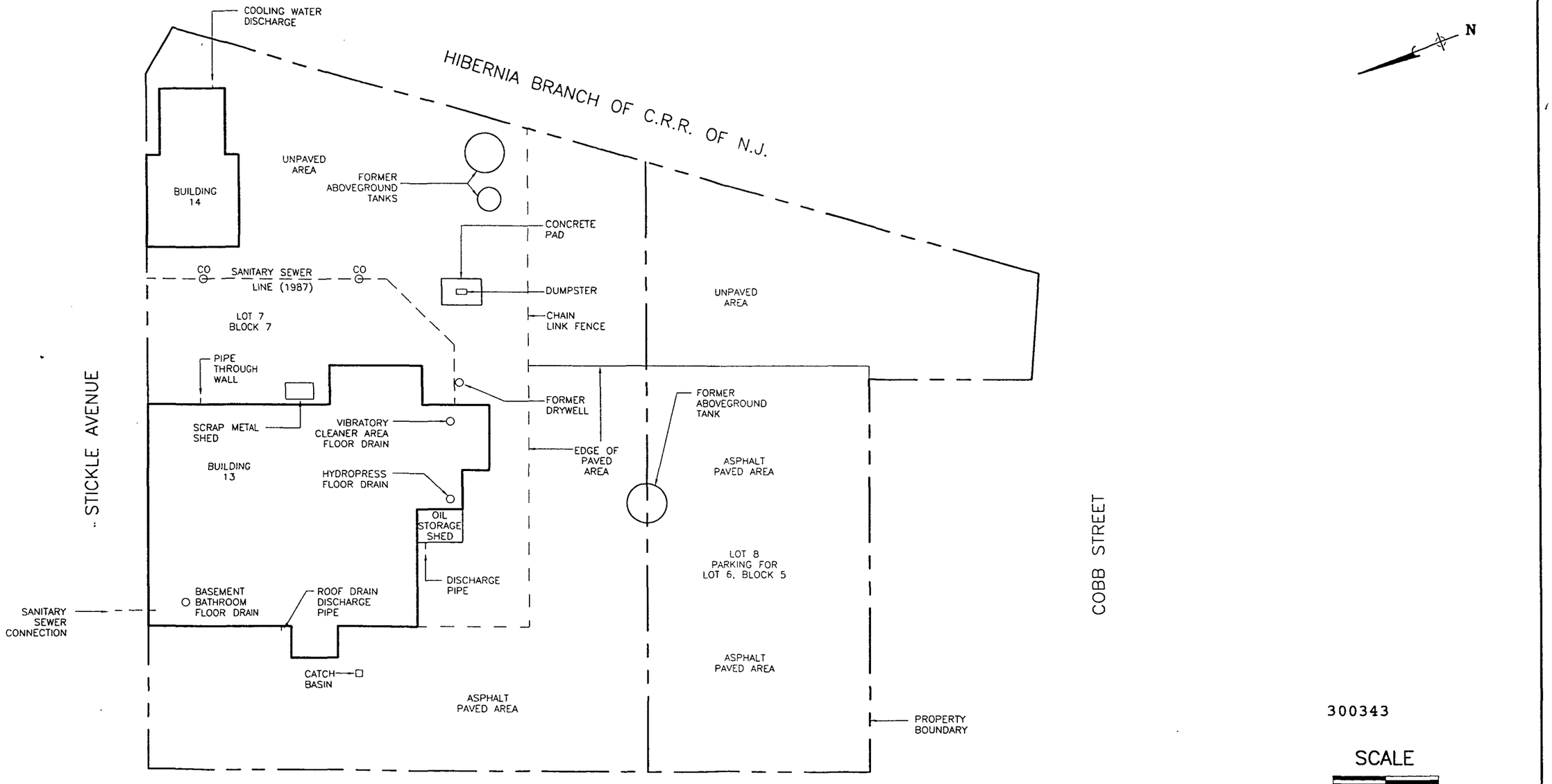
NOTE: TANKS 1 THRU 5 HAVE BEEN REMOVED.

SOURCE: FIRST ENVIRONMENT

300342

NOT TO SCALE

THE WHITMAN COMPANIES, INC.	KLOCKNER & KLOCKNER PROPERTY ROCKAWAY BOROUGH MORRIS COUNTY, NJ	
	SITE MAP BUILDING 12	
ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#:	DATE: MAY 1996	FIGURE: 3.1

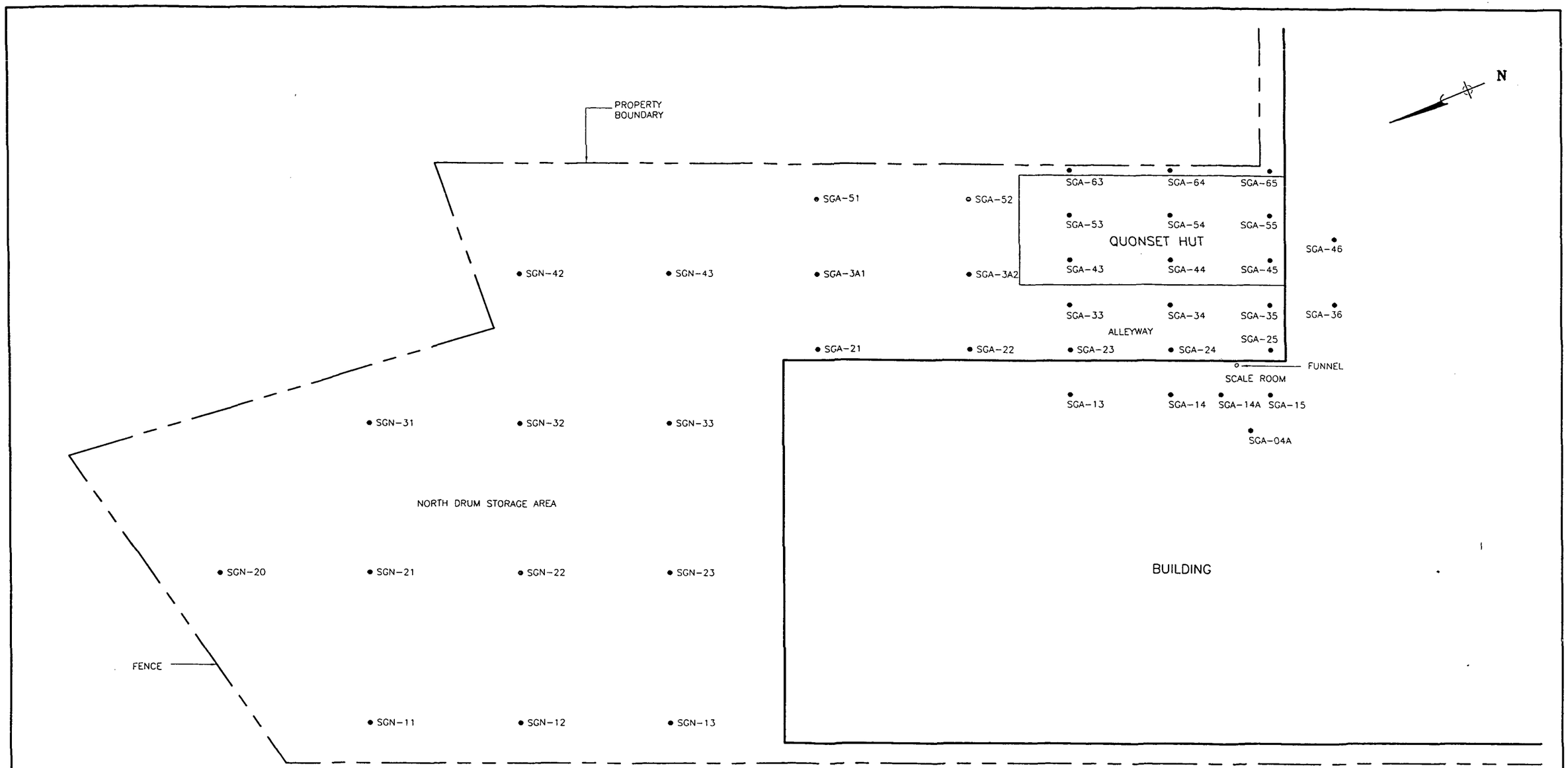


300343

SCALE

0 40'

THE WHITMAN Companies, INC.	KLOCKNER & KLOCKNER PROPERTY ROCKAWAY BOROUGH MORRIS COUNTY, NJ	
	SITE MAP BUILDING 13	
ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#: 950302X	DATE: MAY. 1996	FIGURE: 3.2



300344

LEGEND

- • – PROPOSED SOIL GAS SAMPLE LOCATION
- SGN-23 – NORTHERN DRUM STORAGE AREA SAMPLE
- SGA-23 – ALLEYWAY AREA SAMPLE
- SGA-3A4 – GRID ROW LOCATION / GRID COLUMN LOCATION / LOCATION OFF OF GRID

SCALE

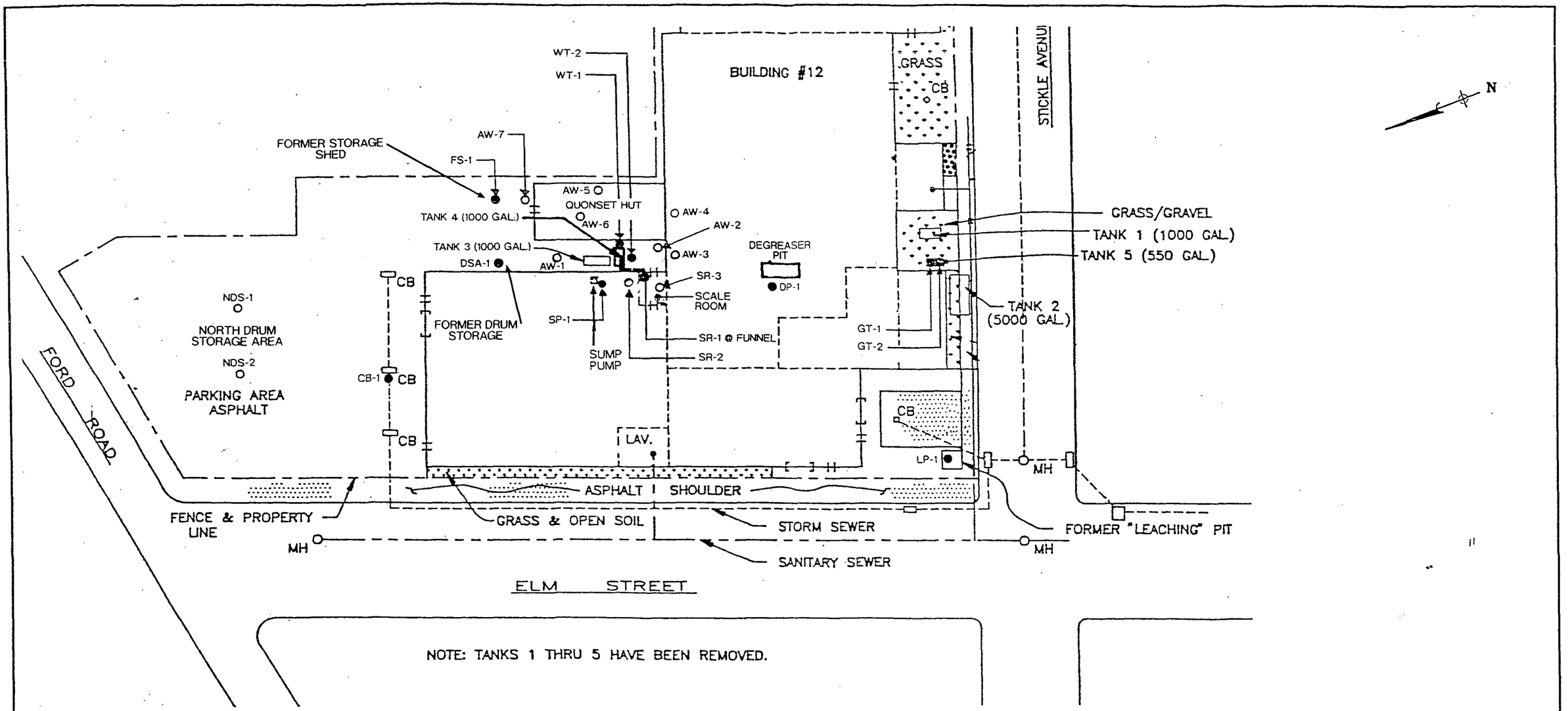
0 20'

THE WHITMAN COMPANIES, INC.

KLOCKNER & KLOCKNER PROPERTY
ROCKAWAY BOROUGH
MORRIS COUNTY, NJ

PROPOSED SOIL GAS SURVEY
BUILDING 12

ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#: 9503021	DATE: MAY 1996	FIGURE: 5.1



NOTE: TANKS 1 THRU 5 HAVE BEEN REMOVED.

300345

SCALE

0 40'

LEGEND

CB – CATCH BASIN

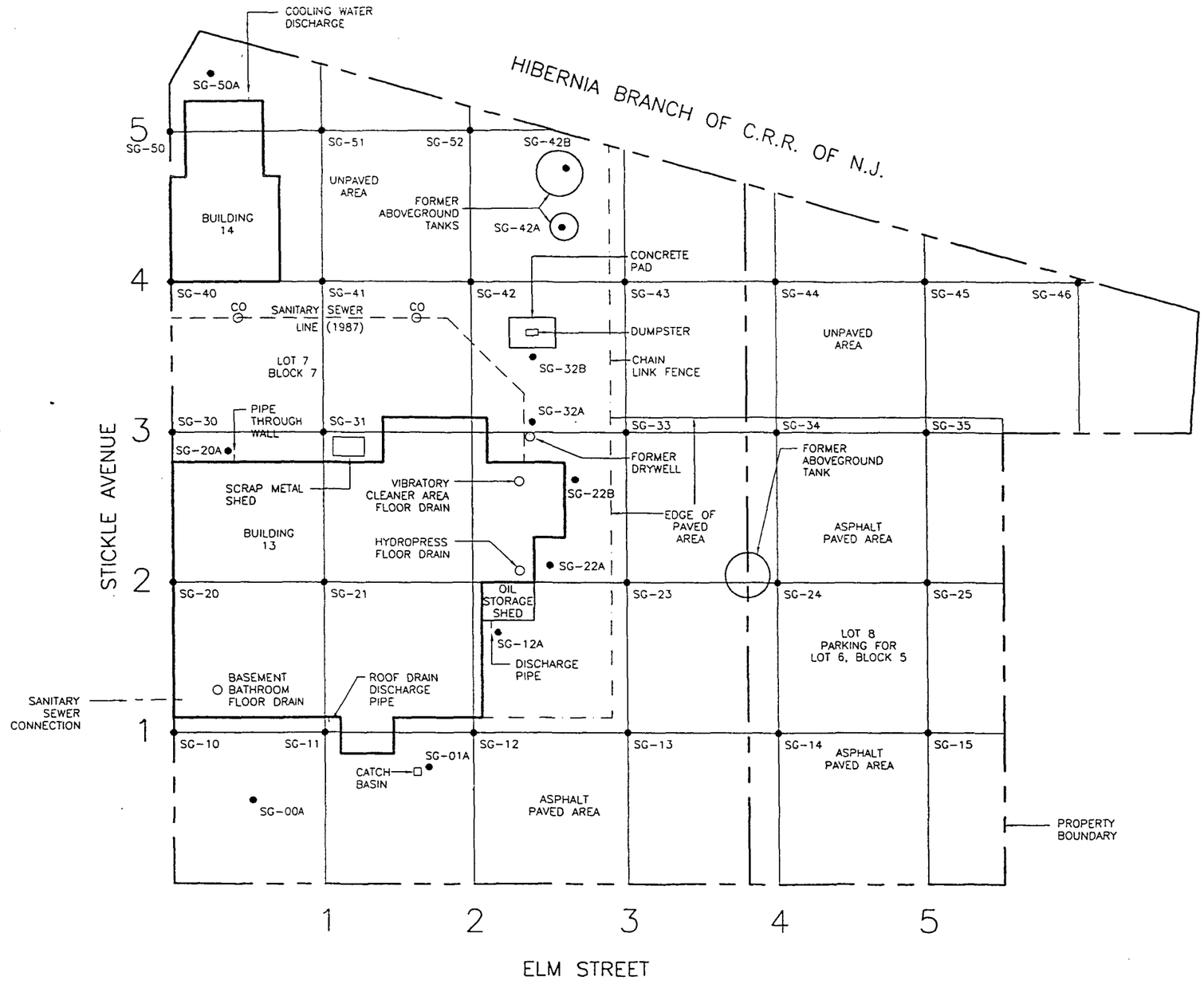
SP-1 – SAMPLE DESIGNATION (TYPICAL)

● – PROPOSED SOIL SAMPLE LOCATION

O – POTENTIAL SOIL SAMPLE LOCATION ACTUAL LOCATIONS WILL BE BASED ON RESULTS OF SOIL GAS SURVEY

ALL SAMPLE LOCATIONS ARE SOIL SAMPLES.

THE WHITMAN Companies, INC.	KLOCKNER & KLOCKNER PROPERTY ROCKAWAY BOROUGH MORRIS COUNTY, NJ	
	PROPOSED SOIL SAMPLE LOCATIONS BUILDING 12	
ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#:	DATE: MAY. 1996	FIGURE: 5.2



LEGEND

SG-01 – PROPOSED SOIL GAS SURVEY SAMPLE LOCATION

SG-32B — GRID ROW LOCATION
LOCATION OFF GRID
GRID COLUMN LOCATION

300346

SCALE

0 40'

THE WHITMAN CompanieS, INC.	KLOCKNER & KLOCKNER PROPERTY ROCKAWAY BOROUGH MORRIS COUNTY, NJ	
	SOIL GAS SURVEY BUILDING 13	
ORIG. BY: MM	DWG. BY: A. Villar	CHK. BY: MM
DWG.#: 950302X	DATE: MAY. 1996	FIGURE: 5.3

APPENDIX 1

APPENDIX 1

FEBRUARY 1994 NJDEP SOIL CLEANUP CRITERIA GUIDELINES

300348

Soil Cleanup Criteria (mg/kg)
(Last Revised - 2/3/94)

300349

This listing represents the combination of Tables 3-1 and 7-1 from the Department of Environmental Protection and Energy's February 3, 1992 proposed rule entitled Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D, with noted corrections based upon errors identified by the Department during or subsequent to the comment period as well as new toxicological information obtained since the rule proposal. Please refer to the respective footnotes for more detail. Notwithstanding, where the following criteria are based on human health impacts, the Department shall still consider environmental impacts when establishing site specific cleanup criteria. This along with other site specific factors including background conditions may result in site specific cleanup criteria which differ from the criteria listed below. Therefore, this list shall not be assumed to represent approval by the Department of any remedial action or to represent the Department's opinion that a site requires remediation.

Note: Material bracketed [thus] is deleted and material underlined thus is added

Contaminant	CASRN	Residential Direct Contact Soil Cleanup Criteria(a)(b)	Non Residential Direct Contact Soil Cleanup Criteria(a)(b)	Impact to Ground water Soil Cleanup Criteria(b)
Acenaphthene	83-32-9	3400	10000(c)	100
Acetone	67-64-1	1000(d)	1000(d)	[50] 100(i)
Acrylonitrile	107-13-1	1	5	[100] 1(i)
Aldrin	309-00-2	0.040	0.17	50
Anthracene	120-12-7	10000(c)	10000(c)	[500] 100(i)
Antimony	7440-36-0	14	340	(h)
Arsenic	7440-38-2	[2(f)] 20(e)	[2(f)] 20(e)	(h)
Barium	7440-39-3	700	47000(n)	(h)
Benzene	71-43-2	3	13	1
3,4-Benzofluoranthene (Benzo(b)fluoranthene)	205-99-2	0.9	4	[500] 50(i)
Benzo(a)anthracene	56-55-3	0.9	4	500
Benzo(a)pyrene (BaP)	50-32-8	0.66(f)	0.66(f)	100
Benzo(k)fluoranthene	207-08-9	0.9	4	500
Benzyl Alcohol	100-51-6	10000(c)	10000(c)	50
Beryllium	7440-41-7	1(f)	1(f)	(h)
Bis(2-chloroethyl) ether	111-44-4	0.66(f)	3	[1] 10(j)
Bis(2-chloroisopropyl) ether	39638-32-9	2300	10000(c)	10
Bis(2-ethylhexyl) phthalate	117-81-7	49	210	100
Bromodichloromethane (Dichlorobromomethane)	75-27-4	[5] 11(g)	[22] 46(g)	1
Bromoform	75-25-2	86	370	1
Bromomethane	74-83-9	79	1000(d)	1
2-Butanone (MEK)	78-93-3	1000(d)	1000(d)	50
Butylbenzyl phthalate	85-68-7	1100	10000(c)	100
Cadmium	7440-43-9	1	100	(h)

Soil Cleanup Criteria (mg/kg)
(Last Revised - 2/3/94)

Carbon tetrachloride	56-23-5	2(k)	4(k)	1
4-Chloroaniline	106-47-8	230	4200	(r)
Chlorobenzene	108-90-7	37	680	1
Chloroform	67-66-3	19(k)	28(k)	1
4-Chloro-3-methyl phenol (p-Chloro-m-cresol)	59-50-7	10000(c)	10000(c)	100
Chloromethane	74-87-3	520	1000(d)	10
2-Chlorophenol	95-57-8	280	5200	[50] 10(j)
Chrysene	218-01-9	9	40	500
Copper	7440-50-8	600(m)	600(m)	(h)
Cyanide	57-12-5	1100	21000(o)	(h)
4,4'-DDD (p,p'-TDE)	72-54-8	3	12	[100] 50(i)
4,4'-DDE	72-55-9	2	9	[100] 50(i)
4,4'-DDT	50-29-3	2	9	[100] 500(i)
Dibenz(a,h)anthracene	53-70-3	0.66(f)	0.66(f)	[500] 100(j)
Dibromochloromethane (Chlorodibromomethane)	124-48-1	110	1000(d)	1
Di-n-butyl phthalate	84-74-2	5700	10000(c)	100
Di-n-octyl phthalate	117-84-0	1100	10000(c)	100
1,2-Dichlorobenzene	95-50-1	5100	10000(c)	50
1,3-Dichlorobenzene	541-73-1	5100	10000(c)	100
1,4-Dichlorobenzene	106-46-7	570	10000(c)	100
3,3'-Dichlorobenzidine	91-94-1	2	6	100
1,1-Dichloroethane	75-34-3	570	1000(d)	[1] 10(i)
1,2-Dichloroethane	107-06-2	6	24	1
1,1-Dichloroethene	75-35-4	8	150	10
1,2-Dichloroethene (trans)	156-60-5	1000(d)	1000(d)	50
1,2-Dichloroethene (cis)	156-59-2	79	1000(d)	[50] 1(i)
2,4-Dichlorophenol	120-83-2	170	3100	10
1,2-Dichloropropane	78-87-5	10	43	(r)
1,3-Dichloropropene (cis and trans)	542-75-6	4	5(k)	1
Dieldrin	60-57-1	0.042	0.18	50
Diethyl phthalate	84-66-2	10000(c)	10000(c)	50
2,4-Dimethyl phenol	105-67-9	1100	10000(c)	10
Dimethyl phthalate	131-11-3	10000(c)	10000(c)	50
2,4-Dinitrophenol	51-28-5	110	2100	10
Dinitrotoluene (2,4-/2,6- mixture)	25321-14-6	1(l)	4(l)	10(l)
Endosulfan	115-29-7	[3] 340(g)	[52] 6200(g)	50
Endrin	72-20-8	17	310	50
Ethylbenzene	100-41-4	1000(d)	1000(d)	100
Fluoranthene	206-44-0	2300	10000(c)	[500] 100(i)
Fluorene	86-73-7	2300	10000(c)	100
Heptachlor	76-44-8	0.15	0.65	[500] 50(j)
Hexachlorobenzene	118-74-1	0.66(f)	2	[50] 100(i)
Hexachlorobutadiene	87-68-3	[11] 1(g)	[210] 21(g)	[50] 100(g)

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Hexachlorocyclopentadiene	77-47-4	400	7300	100	
Hexachloroethane	67-72-1	6	100	100	
Indeno(1,2,3-cd)pyrene	193-39-5	0.9	4	500	
Isophorone	78-59-1	1100	10000(c)	[10]	50(j)
Lead	7439-92-1	100(p)	600(q)	(h)	
Lindane	58-89-9	0.52	2.2	[1]	50(j)
2-Methylphenol	95-48-7	2800	10000(c)	(r)	
4-Methylphenol	106-44-5	2800	10000(c)	(r)	
Methoxychlor	72-43-5	280	5200	[500]	50(i)
Mercury	7439-97-6	14	270	(h)	
4-Methyl-2-pentanone(MIBK)	108-10-1	1000(d)	1000(d)	50	
Methylene chloride	75-09-2	49	210	[10]	1(j)
Naphthalene	91-20-3	230	4200	100	
Nickel	7440-02-0	250	2400(k)(n)	(h)	
Nitrobenzene	98-95-3	28	520	[50]	10(i)
N-Nitrosodiphenylamine	86-30-6	140	600	100	
N-Nitrosodi-n-propylamine	621-64-7	0.66(f)	0.66(f)	[1]	10(j)
PCBs (Polychlorinated biphenyls)	1336-36-3	0.49	2	[100]	50(i)
Pentachlorophenol	87-86-5	6	24	100	
Phenol	103-95-2	10000(c)	10000(c)	50	
Pyrene	129-00-0	1700	10000(c)	[500]	100(j)
Selenium	7782-49-2	63	3100(n)	(h)	
Silver	7440-22-4	110	4100(n)	(h)	
Styrene	100-42-5	23	97	100	
1,1,1,2-Tetrachloroethane	630-20-6	170	310	1	
1,1,2,2-Tetrachloroethane	79-34-5	34	70(k)	1	
Tetrachloroethylene	127-18-4	4(k)	6(k)	1	
Thallium	7440-28-0	2(f)	2(f)	(h)	
Toluene	108-88-3	1000(d)	1000(d)	500	
Toxaphene	8001-35-2	0.10(k)	0.2(k)	[100]	50(i)
1,2,4-Trichlorobenzene	120-82-1	68	1200	100	
1,1,1-Trichloroethane	71-53-6	210	1000(d)	50	
1,1,2-Trichloroethane	79-00-5	22	420	1	
Trichloroethene (TCE)	79-01-6	23	54(k)	1	
2,4,5-Trichlorophenol	95-95-4	5600	10000(c)	50	
2,4,6-Trichlorophenol	88-06-2	62	270	[50]	10(i)
Vanadium	7440-62-2	370	7100(n)	(h)	
Vinyl chloride	75-01-4	2	7	[1]	10(i)
Xylenes (Total)	1330-29-7	410	1000(d)	10	
Zinc	7440-66-6	1500(m)	1500(m)	(h)	

Soil Cleanup Criteria (mg/kg)
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Footnotes

(a) criteria are health based using an incidental ingestion exposure pathway except where noted below
(b) criteria are subject to change based on site specific factors (e.g., aquifer classification, soil type, natural background, environmental impacts, etc.)
(c) health based criterion exceeds the 10000 mg/kg maximum for total organic contaminants
(d) health based criterion exceeds the 1000 mg/kg maximum for total volatile organic contaminants
(e) cleanup standard proposal was based on natural background
(f) health based criterion is lower than analytical limits; cleanup criterion based on practical quantitation level
(g) criterion has been recalculated based on new toxicological data
(h) the impact to ground water values for inorganics will be developed based upon site specific chemical and physical parameters
(i) original criterion was incorrectly calculated and has been recalculated
(j) typographical error
(k) criterion based on inhalation exposure pathway which yielded a more stringent criterion than the incidental ingestion exposure pathway
(l) new criterion derived using methodology in the basis and background document
(m) criterion based on ecological (phytotoxicity) effects
(n) level of the human health based criterion is such that evaluation for potential environmental impacts on a site by site basis is recommended
(o) level of the criterion is such that evaluation for potential acute exposure hazard is recommended
(p) criterion based on the goal that children should be exposed to the minimal amount of lead that is practicable and is reflective of natural background as altered by diffuse anthropogenic pollution. Criterion corresponds to both a median value for urban land which has not been impacted by any local point source of lead and a 90th percentile value for similar suburban land
(q) criteria was derived from a model developed by the Society for Environmental Geochemistry and Health (SEGH) and was designed to be protective for adults in the workplace
(r) Insufficient information available to calculate impact to ground water criteria